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# ELECTRIC RAILWAY JOURNAL

New York, September 2, 1916

McGraw Publishing Co., Inc.

130

Vol. 48, No. 10 10c a copy

## Peter Smith Heaters Are Everywhere

For thirty-five years the name of Peter Smith has dominated in the science and practice of car heating.

Peter Smith heaters are made in every form adapted to electric railway service—hot water, coal burning or electric, forced ventilation, hot air types—to meet the most diverse conditions in fuel or power economy, character of car operation and climate.

Peter Smith experience in car heating problems and Peter Smith variety in car heating equipment will assure heater satisfaction to you and your public.

What are your needs in our field?



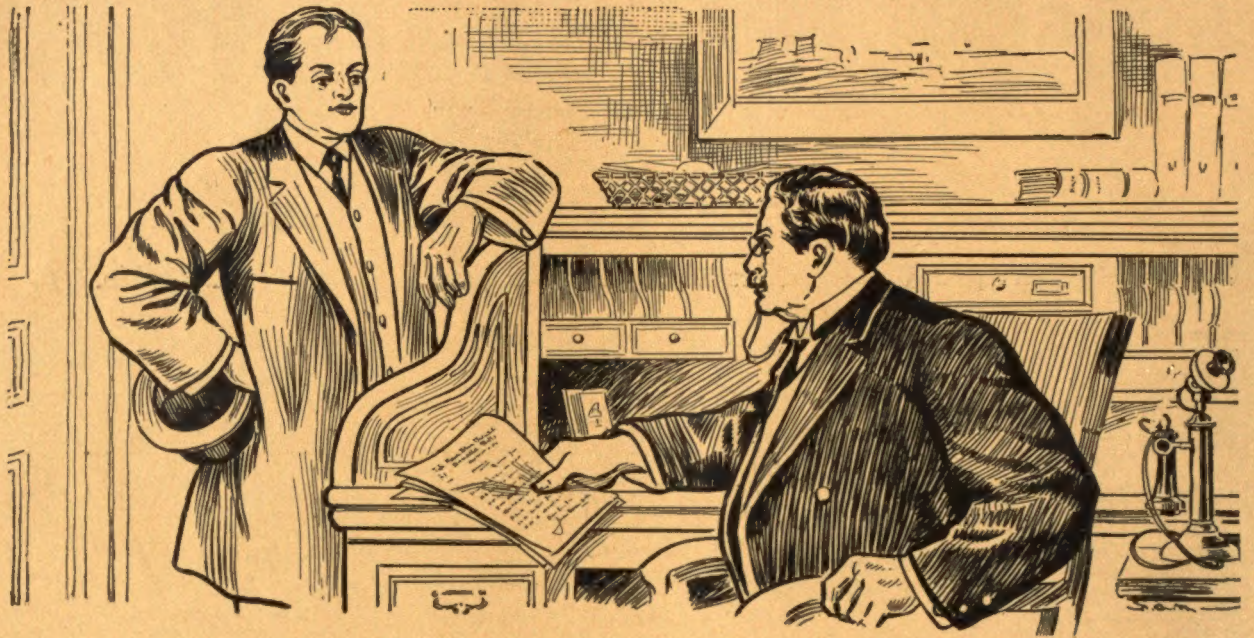
The Peter Smith Heater Co.

Detroit, Mich.

Heater Specialists for Thirty-five Years







## *Keeping Posted*

“**J**OE,” said the General Manager to the Superintendent, “from all I hear the A.E.R.A. convention down at Atlantic City next October is going to be of unusual interest.—Many new developments in railway equipment will be on exhibit.

“You know, we have to be continually on the jump nowadays, if we are to earn even reasonable dividends.—We must keep posted on every new development as it comes along.

“I want you to arrange to be in Atlantic City during the entire convention, and make a careful study of all the exhibits and attend the meeting and discussions, and make me a report of what you saw and learned.

“I understand the Westinghouse People, as usual, are going to be to the front with an exhibit of some new light weight, low clearance motors for one-man car operation, besides other apparatus.—Make a close study of these. You know how we have benefited in the past by using the latest developments in Westinghouse Motors and HL Control.”

“I’ll be there, Boss,” said Joe, “and believe me, I’ll know all about everything the Westinghouse people have to show, before I come away.”

**Westinghouse Electric & Manufacturing Company**

Sales Offices in All  
Large American Cities



East Pittsburgh  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 10

NEW YORK, SEPTEMBER 2, 1916

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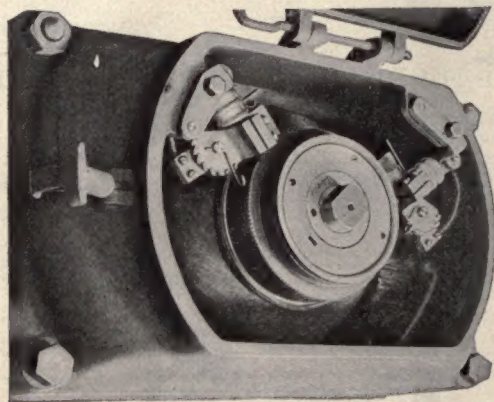
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No back volumes for more than one year, and no back copies for more than three months.

CHANGE OF ADDRESS—When change of address is ordered the new and old addresses must be given.  
Notice must be received at least five days before the change takes place.

Circulation of this issue 7250 copies



## "Bungalow" type of Westinghouse Air Compressors

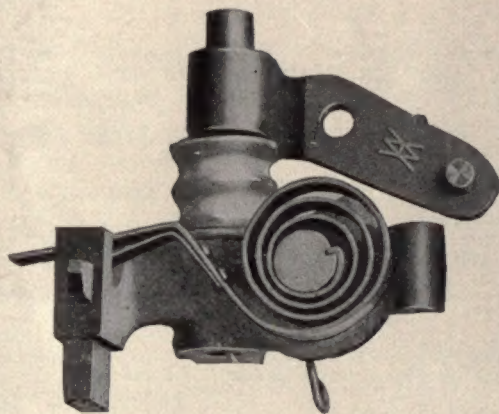


### Brush Holders

- Are permanently located slightly back of neutral position, the most efficient one, since armature rotates in one direction only.
- Are located in lower quadrants, making accessibility easy from the pit. Brushes and holders tend to keep themselves clean.
- Are fastened to motor case with one tap screw and one dowel pin, making removal exceptionally easy.

### Brush Holder Springs

- Are a combination coil and flat spring, which gives double amplitude, takes care of very small vibrations, eliminates chattering, and improves commutation.
- May be given any tension desired by moving the wire lever on the notched dial.
- Provides resting place for flat end of spring while brushes are being taken out.
- Are adjusted without removing and without use of tools.



*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

**General Offices: Wilmerding, Pa.**

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



NEW YORK:

City Investing Building

ST. LOUIS:

Boatmen's Bank Building



# Three 30000 KW. Westinghouse Cross Compound Turbines, 74<sup>th</sup> St. Sta. Interboro Rapid Transit Co.

Accurate tests conducted by the purchaser show a steam economy that has never been equalled.



# Westinghouse

Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.



# Phono-Electric

## The Wire of Wear—and Why



On this narrow but busy thoroughfare—Tenth Street between Walnut Street and Germantown Avenue, Philadelphia—approximately 3 miles of No. 0000 Phono-Electric Trolley Wire were installed December, 1909.

Nearly seven years of service, and “still up.”

Through all these years the “overhead” has staid overhead twenty-four hours a day—

Because Phono-Electric is the same tough wire from circumference to core. It has no skin to crack and make it useless long before actual wear has materially reduced its cross-section.

Phono-Electric is a wire whose life is limited only by the reduction in tensile strength—corresponding to reduction in cross section.

Ordinary hard drawn copper wire has its strength and wearing qualities all in its case-hardened skin. After this skin is worn or nicked the wire may fail at any moment.

Occasional “readings” taken with a pair of calipers on Phono-Electric will anticipate the breaking point long before the danger time.

**BRIDGEPORT BRASS CO.**  
BRIDGEPORT CONNECTICUT



## O-B Type E Cross-Over

Has O-B Bronze Cam Tips. These tips hold the wire firmly in the groove and provide a smooth approach for the wheel.

They not only cut the time of installation but bear the brunt of the wear and are easily and economically renewed.

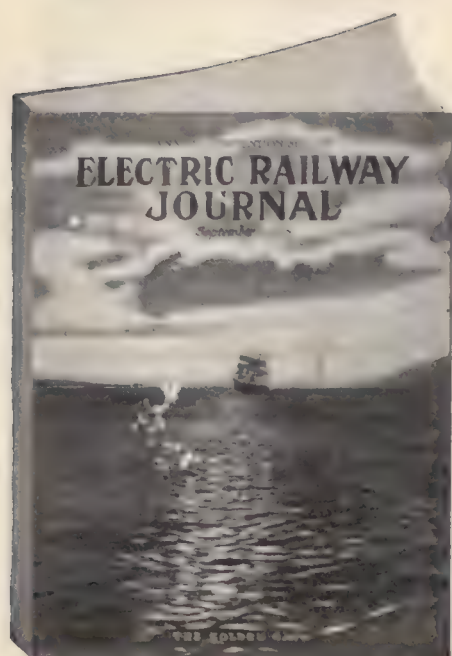
The O-B Type E Cross-Over is used where it is not desired to insulate one wire from the other. It is made in two forms—Form 1 is adjustable between 30° and 60°, Form 2 between 60° and 90°.

The first has deflector bars which are not necessary in the wider angles.

There are 11 forms of Cross-Overs listed on Pages 210-218 of Catalog No. 16. One of them is the right one for you.

**The Ohio Brass Company**  
**Mansfield**  
**Ohio**





# ITS INFLUENCE EXTENDS Around the WORLD

**W**E find that some manufacturers who sell products to the electric railway industry and who do not understand the tremendous influential "reach" of Electric Railway Journal have a particularly narrow conception of the circulation of the **Annual Convention Number**.

Possibly the name of the issue has something to do with this false idea of its limitations.

The facts are that the copies of this Number which are actually distributed at the Convention total only an

extremely small portion of the circulation.

In the first place—every regular subscriber to the Journal receives through the mail his copy of the Convention Number at the address to which his regular weekly copy is sent.

The regular foreign subscribers receive it just as they receive the regular issues.

In addition, at least **one** responsible official of **every** important electric railway in the world (operating or under construction) is furnished with a copy by mail.





And **then**, a relatively limited number is distributed among delegates at the Convention and on the special trains carrying Convention delegations.

In effect the circulation of the Con-

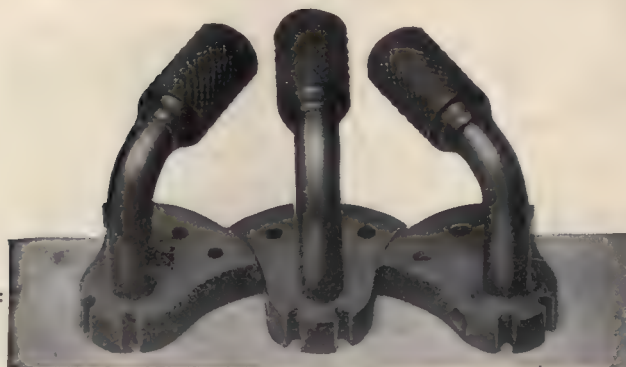
vention Number is 100% **net** for the advertiser.

The extremely valuable data and special material assembled for and published in this number insures a 100% reading audience for the advertisers' messages.

## ***Electric Railway Journal***

239 West 39th Street, New York





East Bound Car



West Bound Car



# The INTERLOCK

## that makes LAP ORDERS Impossible



with the

# SIMMEN SYSTEM

## of Continuous Cab Signals

The device shown above is another example of the simplicity of the Simmen System. By means of this simple mechanical arrangement lap orders are positively prevented. The dispatcher cannot make a mistake.

Each lever controls a signal point and has three definite positions. The upright position indicates that a "meet" is scheduled for that siding, and therefore gives a red signal to trains approaching from both directions.

The levers leaning to the right give the green signal to east bound trains only. The levers leaning to the left give the green signal to west bound trains only.

These control levers are arranged in the same consecutive order that the signal points which they control are arranged on the railroad. It will be obvious that the simple seg-

ment which moves with each control lever prevents setting any given lever in the east bound clear position, when the lever controlling the adjacent siding is in the west bound clear position. Thus lap orders are prevented.

The Simmen System enables the dispatcher—miles away—to give a positive continuous signal *in the cab* of the train and the train itself gives the dispatcher a return signal *automatically*. The method is so simple that many railroad men can scarcely believe it possible, until they have been convinced by a personal investigation.

Why not decide today to investigate the Simmen System thoroughly? You will be interested and enlightened and may profit by the experience.

**Simmen Automatic Railway Signal Co.**  
1575 Niagara Street, Buffalo, N. Y.

PACIFIC COAST REPRESENTATIVE—W. H. Crawford, 609 Spalding Bldg., Portland, Oregon



## These Devices Will Earn Money For You

### The Auto- motoneer



### The Auto- motoneer

The Automotoneer enforces point by point feeding, thereby assuring proper motor acceleration. Reduces motor and controller troubles 40 to 60 per cent. Reduces wear and tear on gears, pinions and entire car equipment. Cuts down heavy peak loads.

The Automotoneer is purely and simply a mechanical device designed for use in connection with the modern street car controller. It "controls the controller" by compelling the motormen to pause at every point from "off" to "on."

Over 35,000 Automotoneers in use are saving money for their users every day. You can prove that they will save money for you by letting us ship 10 or 20 or a hundred on 90 days' trial. Ask us to do this now.

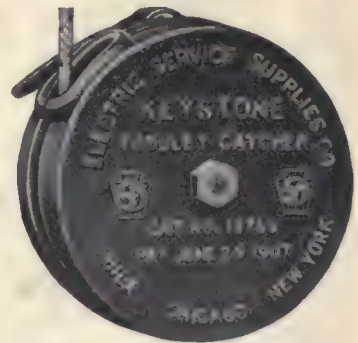
## Keystone Trolley Catchers



Interior View Showing Centrifugal Pawls. Note the Rugged Construction



Section View of Keystone Trolley Catcher Showing Pawl in Operation



Keystone Trolley Catcher Complete and Ready to "Catch" Your Trolley Poles

You should install Keystone Trolley Catchers on your cars to stop the poles from "banging" your overhead construction. Every "bang" leaves a "weak spot" which will sooner or later cause delays or other serious trouble.

And you should install Keystone Catchers because they are positive in operation; because they catch the pole in an upward movement of from three to five inches above the wire; because they will not allow rebounding, and because they are rugged and have few parts. And, too, not a screw is used in their construction; neither do they employ cushioning springs.

Only these Keystone features can give you a strong, durable, "foolproof" Trolley Catcher.

Keystone Trolley Catchers are guaranteed for two years and are sold on a 60-day trial basis. You can't lose—place your order now.

*Write for booklets and quotations.*

## ELECTRIC SERVICE SUPPLIES CO.

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

NEW YORK  
50 Church St.

CHICAGO  
Monadnock Bldg.



# "The Best Poles We Have Ever Received in This City"

## Western Red Cedar Poles

The illustration on this page shows the Chateau and Sillery line of the Quebec Railway, Light, Heat and Power Co., Ltd.

In speaking of the Western Red Cedar Poles used in this line, this company says:

"These WESTERN RED CEDAR POLES are the best poles we have ever received in this city. They are straight, sound and not too large, and fully up to specifications."

Western Red Cedar Poles combine all of the pole qualities desired by the practical builder of serviceable trolley and transmission lines.

They have great strength.

Official tests by the U. S.

Forestry Service shows their average modulus of rupture to be 6910 lbs. per square inch. This is greater than the average modulus of rupture of any other specie of pole timber in general use throughout the country. Western Red Cedar Poles stand up under tremendous side pull and strain.



The Chateau and Sillery Line of the Quebec Railway, Light, Heat & Power Co., showing Western Red Cedar Poles adapted to both trolley and transmission purposes

Western Red Cedar Poles are used in all kinds of pole line construction, east, west, north and south. They are the poles of **Beauty, Strength, Low First Cost, Low Maintenance Cost.** They make the most beautiful line. They take up less room in the curb.

*For Further Information Write*

## Western Red Cedar Association

Peyton Building

Spokane, Washington



Jan. 5, 1901 STREET RAILWAY JOURNAL

**United States Electric Signal Co. 49 GALEN STREET  
WATERTOWN, M.**

**Automatic Block Signals**

Designed especially for use on single track trolley roads. Reliable and practical. Indicate positively whether the section to the next turnout is free or whether occupied by another car . . . . .

Operated by the trolley wheel coming in contact with the trolley-operated switch, contained in a small secured to the trolley wire, and so constructed that one set of signals operates in one direction and any when going in the other direction, lighting the signals in front of the car and extinguishing those in . . . . . When a signal is set for either direction, a signal for the opposite direction is mechanically locked out . . . . .

IF INTERESTED, WRITE FOR DESCRIPTIVE MATTER

# Stability

Back when the present century started, the United States Electric Signal Company was a going and growing organization, as shown by the above advertisement clipped from the Street Railway Journal, first issue of 1901.

That was sixteen years ago.

Through these years the U. S. organization has placed at the call of electric railways exclusively a manufacturing plant, an engineering force and a desire to serve.

Can you afford to trust so important a consideration as safety of lives and equipment to an organization without a stable record?

Stability is just as important in signaling as in banking.

Think it over!

## United States Electric Signal Company

West Newton, Massachusetts

Representatives

Western: Frank F. Bodler, Monadnock Bldg., San Francisco  
Chicago, Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.





If you are using an out-of-date list of electric railways, you may be surprised to know that in one year there are 3436 changes in electric railway officials.

# **McGRAW ELECTRIC RAILWAY LIST**

*August, 1916*

Published Semi-Annually  
in Connection with the  
**McGraw Electrical Trade Directory**  
[ Railway Edition ]

---

Subscription Price \$5.00 per Year  
Single Copies \$3.00

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**McGraw Publishing Co., Inc.**  
239 West 39th Street  
New York

Last year 1144 officials or heads of departments left the field; 1104 new ones entered the field; 1188 changed from one company to another. Thirty-five per cent of the list of names changed in one year.

The lesson is obvious. Send for the August, 1916 issue of the McGraw Electric Railway List at once. \$3.00 per copy or \$5.00 per year. Issued in August and February.



# The ELRECO Tubular Pole

—the Pole of  
Least Maintenance  
and Replacement

The cylindrical form of Elreco Tubular Poles, which makes them lowest in first cost; also makes them lowest in maintenance cost.

The committee on Power Distribution of A. E. R. A., after a thorough investigation, recommended the use of the Tubular Steel Pole. This is the only form of steel pole ever recommended by this committee. The record of simplicity, ease of handling, reliability and durability of Elreco Poles over a period of twenty-five years was reflected in this recommendation.

All steel products must necessarily be protected from corrosion. This is true of steel poles, and time has proved that Tubular Steel Poles are the least affected by action of the air and moisture and are most accessible for painting.

Elreco Poles have no angles or pockets to retain moisture, and no corners that are accessible to corrosion. Therefore, they are less subject to the ill effect of corrosion than are structural steel poles. Owing to the tubular shape any Elreco Pole can be furnished with protecting sleeve, which provides double thickness of metal at the ground line.

It is evident that the pole least susceptible to corrosion will give the longest life—The ELRECO has that record.



## ELRECO Tubular Poles

Combine

Lowest Cost  
Lightest Weight  
Least Maintenance  
Greatest Adaptability

### Electric Railway Equipment Co.

Cincinnati, Ohio  
New York: 30 Church St.





# Light Signals



On the Electrified Lines  
of the Chicago, Milwaukee &  
St. Paul Railroad, over the Big  
Belt and Rocky Mountains.



# THE UNION SWITCH & SIGNAL CO.

TRADE



MARK

Founded by Geo. Westinghouse 1881.  
SWISSVALE, PA.

Hudson Terminal Bldg.  
New York

Peoples Gas Bldg.  
Chicago

Canadian Express Bldg.  
Montreal

Candler Annex  
Atlanta

Railway Exchange Bldg.  
St. Louis, Mo.

Pacific Bldg.  
San Francisco





## Can Your Interurban Riders Ride Facing Each Other?

When you place reversible cross-seats in a city car, you want all of them to face one way. Hence both your seat spacing and your conductor discourage face-to-face riding.

But it's different on the interurban cars. Passengers on long rides get tired look-

ing at the scenery and want to face one another over a table for a little chat or luncheon.

Imagine their disappointment if they find that the seat centering is so scant that they have no comfortable knee-room between the cushions!

## That's Where Hale & Kilburn Experience Counts

In providing a seat like the 199 A E Interurban, which when spaced 33 in. centers (in the case of 20-in. backs) gives 12 in. between cushions when the backs face one another.

We have mentioned this point as a reminder that we are offering you not

only a superior seat mechanism and construction, but also our *experience* in solving seat problems.

Let us go over the seating plans with you before you decide what type and number you are going to place in those new cars!



# Hale & Kilburn Co.

Philadelphia New York Chicago  
Washington San Francisco



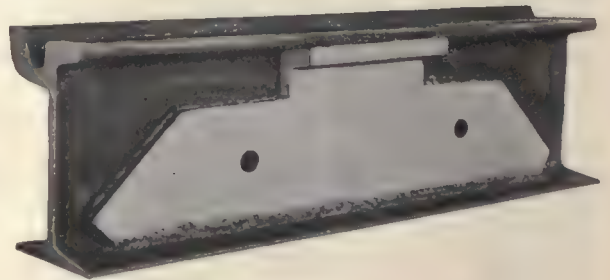


# More Indianapolis Simplex and Apex Joints

Sold first 6 months 1916  
Than all last year

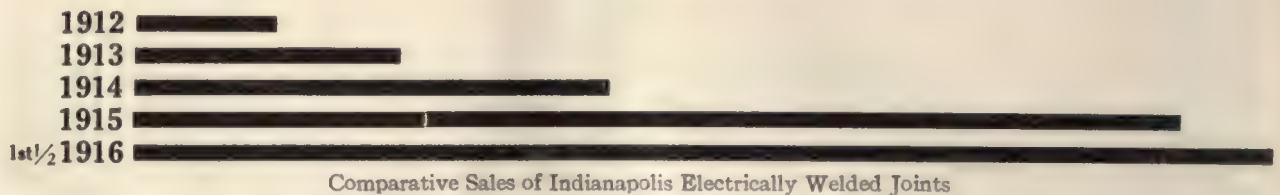


"Simplex" Joint



"Apex" Joint

## See How They Grow



Can Furnish Joints on 1 Week's Notice  
after September 1st

*Immediate Shipment of—*

Electric Welders

Welding Steel

Diamond Turnouts

Tee Rail Tongue Switches, Mates, Frogs

Split Switches, Switch Stands

Splice Bars, Braces, Guards

## Indianapolis Switch & Frog Company

Springfield, Ohio



# "Armco" Iron Corrugated Culverts

For Adaptability, Efficiency  
and Long Service

They are adapted to the best and the worst of conditions. Their corrugated form and overlapping joints confer ample strength together with a resiliency or *toughness* which enables them to stand more grief and hard luck than anything else in the form of a culvert.

For extreme conditions they are readily available in heavier than standard gauges. And their material is the recognized standard for Purity and Rust-Resistance.



*A postal card to the nearest manufacturer will bring you full information on "Armco" (American Ingot) Iron Culverts, Siphons, Flumes, Sheets, Roofing and Formed Products*

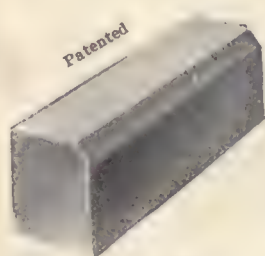
**Arkansas, Little Rock**  
Dixie Culvert & Metal Co.  
**California, Los Angeles**  
California Corrugated Culvert Co.  
**California, West Berkeley**  
California Corrugated Culvert Co.  
**Colorado, Denver**  
R. Hardesty Mfg. Co.  
**Delaware, Clayton**  
Delaware Metal Culvert Co.  
**Florida, Jacksonville**  
Dixie Culvert & Metal Co.  
**Georgia, Atlanta**  
Dixie Culvert & Metal Co.  
**Illinois, Bloomington**  
Illinois Corrugated Metal Co.  
**Indiana, Crawfordsville**  
W. Q. O'Neill Co.  
**Iowa, Des Moines**  
Iowa Pure Iron Culvert Co.  
**Iowa, Independence**  
Independence Culvert Co.

**Kansas, Topeka**  
The Road Supply & Metal Co.  
**Kentucky, Louisville**  
Kentucky Culvert Mfg. Co.  
**Louisiana, New Orleans**  
Dixie Culvert & Metal Co.  
**Maryland, Havre de Grace**  
J. N. Spencer.  
**Massachusetts, Palmer**  
New England Metal Culvert Co.  
**Michigan, Bark River**  
Bark River Bridge & Culvert Co.  
**Michigan, Lansing**  
Michigan Bridge & Pipe Co.  
**Minnesota, Minneapolis**  
Lyle Corrugated Culvert Co.  
**Minnesota, Lyle**  
Lyle Corrugated Culvert Co.  
**Missouri, Moberly**  
Corrugated Culvert Co.  
**Montana, Missoula**  
Montana Culvert & Flume Co.

**Nebraska, Lincoln**  
Lee-Arnett Co.  
**Nebraska, Wahoo**  
Nebraska Culvert & Mfg. Co.  
**Nevada, Reno**  
Nevada Metal Mfg. Co.  
**New Hampshire, Nashua**  
North-East Metal Culvert Co.  
**New Jersey, Flemington**  
Pennsylvania Metal Culvert Co.  
**New York, Auburn**  
Pennsylvania Metal Culvert Co.  
**North Dakota, Wahpeton**  
Northwestern Sheet & Iron Works  
**Ohio, Middletown**  
The Ohio Corrugated Culvert Co.  
American Rolling Mill Co.  
**Oklahoma, Shawnee**  
Dixie Culvert & Metal Co.  
**Oregon, Portland**  
Coast Culvert & Flume Co.

**Pennsylvania, Warren**  
Pennsylvania Metal Culvert Co.  
**South Dakota, Sioux Falls**  
Sioux Falls Metal Culvert Co.  
**Tennessee, Nashville**  
Tennessee Metal Culvert Co.  
**Texas, Dallas**  
Wyatt Metal Works  
**Texas, El Paso**  
Western Metal Mfg. Co.  
**Texas, Houston**  
Lone Star Culvert Co.  
**Utah, Woods Cross**  
Utah Corrugated Culvert & Flume Co.  
**Virginia, Roanoke**  
Virginia Metal Culvert Co.  
**Washington, Spokane**  
Spokane Cor. Culvert & Tank Co.  
**Wisconsin, Eau Claire**  
Bark River Bridge & Culvert Co.

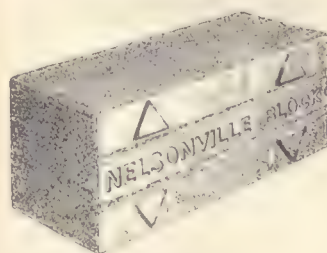




**Nelsonville  
Stretcher  
Brick**



**Nelsonville  
Filler  
Brick**



**Nelsonville  
Block**

## Why Should It Cost As Much to Maintain Pavement As Track?

In Chicago at the beginning of 1914 paving in the track allowance represented an investment of \$7,373,683, or about one-fifth of the total track cost, yet the pavement maintenance cost was approximately equal to that for the track.

This brings out the importance of selecting a pavement with due regard to the cost of its maintenance. Nelsonville Patent Rail Brick offers a considerable saving in maintenance due to the fact that the ungrouted joint between the filler and stretcher breaks up the rail vibrations and prevents any displacement of brick in the pavement. In this construction all such maintenance cost and annoyance as results from the "kicking up" of the old style nose brick is eliminated. Then, too, track costs can be lowered by installing T-rail instead of the more expensive girder rail.

## NELSONVILLE BRICK

MAKES A

**Smooth Pavement That Stays Smooth**  
and a smooth pavement is in demand today, whereas a decade ago smooth pavements were objectionable because they were too slippery for horse-drawn vehicles.

*Write for this Booklet*

Let us send you sample bricks and our booklet—  
"Rail Brick of the Right Sort."

**The Nelsonville Brick Co.**

Nelsonville, Ohio





1

Reciprocating Track  
Grinder in operation—  
car approaching



2

Swinging grinder off  
track before car arrive

## No Traffic Delays with this Machine—

These pictures tell the story better than words—they show the ease and speed with which the

## Reciprocating Track Grinder

may be removed from tracks when car approaches and swung back on to the job again when the car passes without holding up traffic—even on busy metropolitan lines.

This feature enables you to avoid expensive night work—dispense with cross-overs—and all temporary rerouting of cars.

This machine is a self-contained, mobile unit, working continuously and moving about your tracks without assistance from trackmen, flagmen or causing other inconvenience to your transportation department and the public.



3

Car passing without being stopped



4

Returning grinder to track after  
car passes



5

Grinding resumed—Time lost  
40 seconds

## Railway Track-work Co.

30th and Walnut Sts., Philadelphia

write for data  
on this  
machine





## That Hartford Installation of International Steel Twin Ties

In our Feb. 26 advertisement we showed, in its earlier stages, an installation of International Steel Twin Ties for 1500 ft. of double track on South Main Street, Hartford.

Here's a view taken at a later date.

On this job International Steel Twin Ties spaced 6 ft. centers replaced wooden ties spaced 2 ft.

The life of this track will be measured by the life of the head of the rail as a whole.

Failure of the rails at the joints, which

is caused largely by the decay and failure of the wooden ties under them, will not make it necessary to reconstruct this track while a large part of the rail is still in good condition, because the joints are so well supported by our twin tie that they are as strong as any part of the track.

No part of this construction can decay, and it is the most nearly permanent yet built.

Why not write for data and prices?

We have a stock of steel on hand and can make prompt shipment of ties.

### The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

#### REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal.,  
Los Angeles, Cal., Seattle, Wash.

R. I. Cooper Co.,  
Salt Lake City, Utah.

J. E. Lewis & Co.,  
Dallas, Texas.

Maurice Iov,  
Philadelphia

William H. Ziegler,  
Minneapolis, Minn.



# Columbia Brake Levers

No. 6—

## Reaming and Bushing

The last steps in the making of a Columbia brake lever are reaming and bushing.

Reaming assures a clean, smooth hole and the exact diameter.

The bushings inserted in the reamed holes will stay firm and wear long—



Like all of these Columbians:

### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

### CAR EQUIPMENT

Armature and Axle Bearings  
Armature and field coils  
Bearings (Bronze and Iron)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or mall. iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels

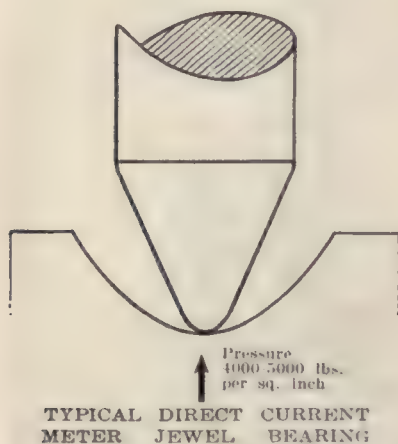


## Columbia Machine Works & Malleable Iron Co.

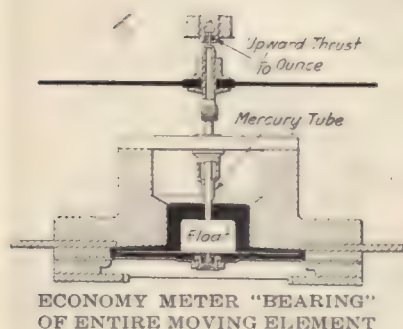
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



# Bearings built to withstand severe service—that's what makes Sangamo Meters practicable



**ECONOMY**  
  
**METERS**



All meter bearings are like drills. The blunter the drill (or the harder and smoother this pivot) the harder and smoother the glass or jewel, and the less the bearing pressure, the less the wear and the longer the life of the bearing.

In this typical direct current meter jewel bearing, the weight of the entire moving element is supported by the jewel almost on a point. This bearing pressure is often as much as 4000 or 5000 lbs. per sq. in. The crushing strength of the jewel itself is about 6000 lbs. per sq. in. Note the insufficient factor of safety. Add to this bearing pressure the hammer-like blows of vibration and small wonder that the jewel crumbles under severe service.

In the Sangamo Economy meter the bearing, a ring and end-stone jewel, is above. The pressure on the jewel is due, not to the **weight** of the moving element, but to its **upward thrust** due to being submerged in the chamber of mercury. This total thrust is less than 1/10 oz. The hammer blows of vibration are absorbed and damped out by the mass of liquid surrounding the moving element, and the severest service cannot break a Sangamo pivot or crumble a Sangamo jewel.



## Sangamo Electric Company

### Springfield, Illinois

Specialists in Meters for Every Electrical Need





## NEVASPLIT HEADLINING

cannot warp or deteriorate under any conditions of service—it provides a strikingly beautiful surface which is permanent in the widest sense of the word.

That is why it has been selected for use in the car of the Bay State Street Railway Co., shown here, and many other large roads all over the country.

Use it for renewing old headlinings and in rebuilding, and specify it for your new cars. It's economical in first cost and in eventual cost. Samples and prices at your request.

**The Keyes Products Company,** **EQUITABLE BLDG.**  
**120 BROADWAY, NEW YORK**

New York, Chicago, San Francisco, Cal., Washington, D. C.  
W. R. Kerschuer Co., Inc., 50 Church St. J. E. Simons, Fisher Bldg. D. E. Ford, Merchants' Exchange Bldg. R. H. Pilson, Munsey Bldg.





*Largest Manufacturers of Commercial Motor Vehicles in America*



White 1½-2-ton Tower Truck, one of the fifteen White Trucks owned by the Georgia Railway & Power Company

## WHITE TRUCKS

**I**N building motor trucks it is the policy of The White Company to make them the highest grade at whatever cost. This policy is founded on the conviction that nothing less sturdy, or less refined, or less expensive can efficiently and economically meet the actual requirements of motor truck service.

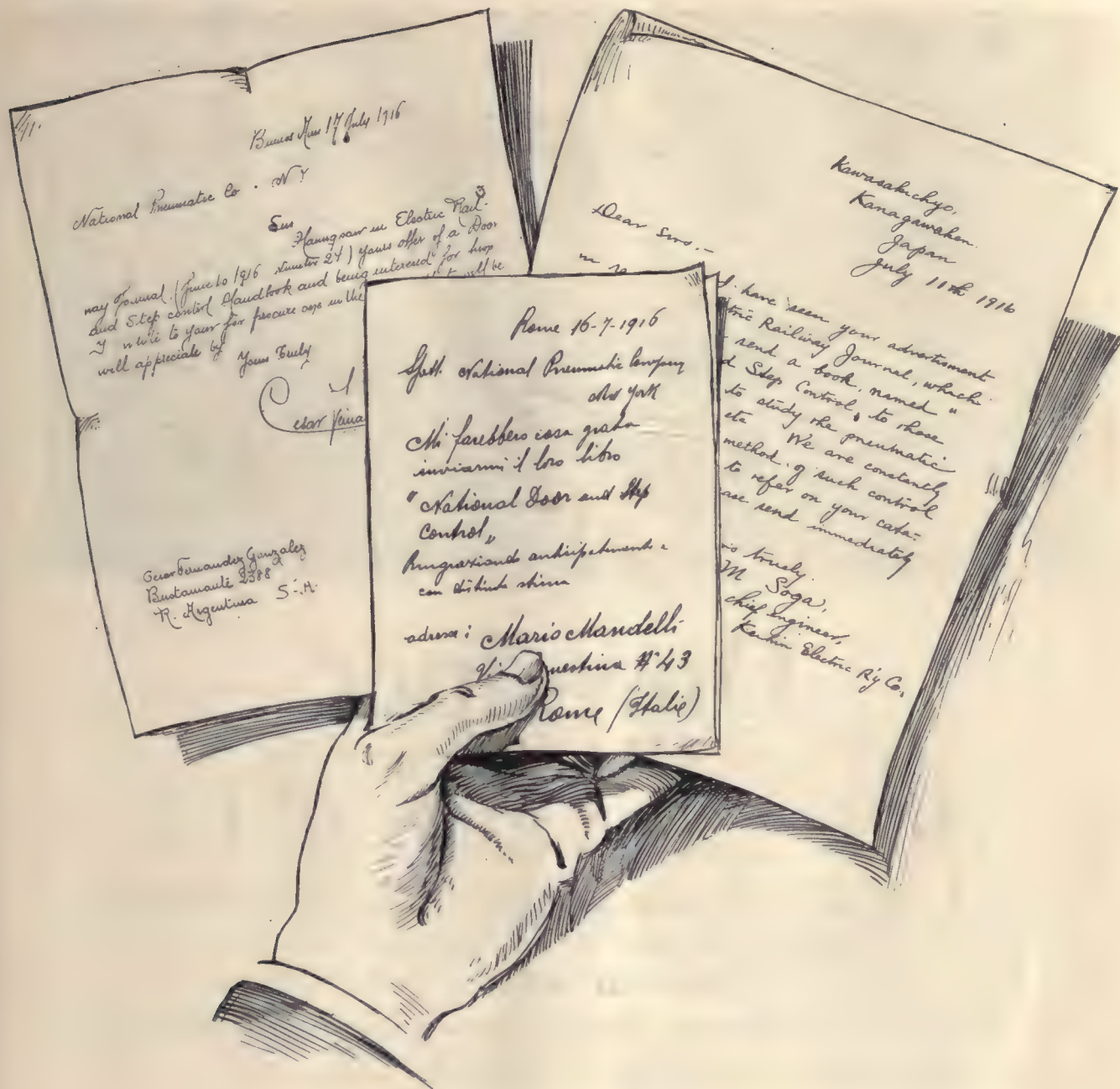
*White Trucks are built in capacities ranging from 1500 pounds to 5 tons. Send for special folder describing White Trucks in Electric Railway Service.*



**THE WHITE COMPANY**  
CLEVELAND

*Awarded the ONLY GRAND PRIZE for Motor Trucks at the Panama-Pacific International Exposition, San Francisco*





**Our Book** on National Door and Step Control IS GOING to The Engineers of Argentina, Italy, Japan and other Countries

*Have you received YOUR Copy?*

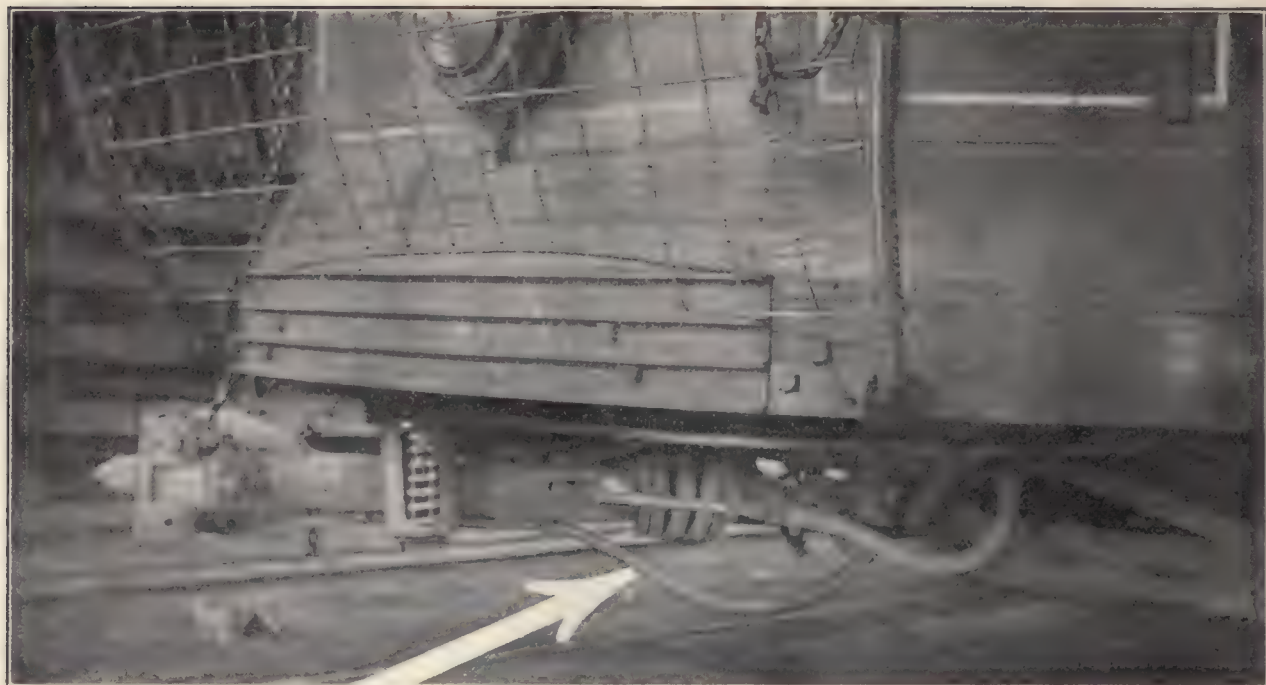
**NATIONAL PNEUMATIC COMPANY**

50 Church St. New York



515 Laflin St. Chicago





# Duraduct

Reg. U. S. Pat. Off.

## Boston Has Miles of It!

The Boston Elevated Railway has recently received a total of 33,435 ft. or 6.3. Miles of Duraduct. ....

In diameters of  $\frac{3}{8}$ in.,  $\frac{1}{2}$ in.,  $\frac{5}{8}$ in. and  $\frac{3}{4}$ in.

For the circuits of trailer cars, motor cars and Lindall articulated units  
Comprising both new and existing equipment.

### *There are reasons!*

No Elbows	Tough
No Threading	Flexible
Non-raveling	Fireproof
Non-blistering	Waterproof
Non-collapsible	Easy to fish

and

Light as a Feather

Sample on Request

## TUBULAR WOVEN FABRIC CO.

MANUFACTURERS

PAWTUCKET, R. I.

A. HALL BERRY, General Sales Agent

97 Warren St., New York

9 So. Clinton St., Chicago

Distributors for Canada: NORTHERN ELECTRIC COMPANY, Ltd.





# THE OHMER SYSTEM

**T**HE basis of the Ohmer System is an indicating, recording and printing fare register, so installed that each registration is given the **greatest possible publicity**. Auxiliary indicators in various parts of the car indicate the fare simultaneously with the register. A printed record of the day's business is made automatically. This record goes direct to the auditor's office and tells a complete story of the day's work. It gives all the fare collection data, and in addition reveals the individual tendencies of each conductor. The information is compiled under the Ohmer System plan in such a way that discipline can be intelligently and effectively applied.

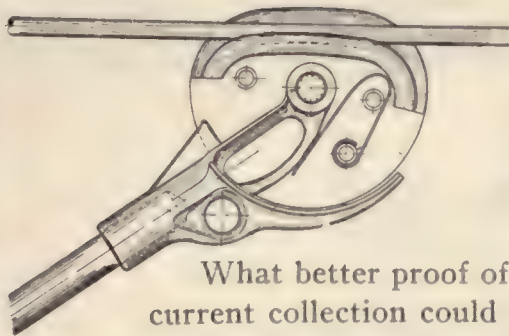
Under the Ohmer System the conductor is treated as a responsible agent who sells transportation. When he is no longer worthy of that responsibility the fact is clearly shown by his merit analysis. The men who serve you well are quickly recognized, as well as those who should be disciplined or discharged. The Ohmer System is based upon correct business principles. Ohmer registers and Ohmer operating equipments are adapted to all types of cars and to all conditions under which electric railway cars are operated.

**OHMER FARE REGISTER COMPANY**  
**Dayton, Ohio.**





C E Locomotive hauling  
82-car 2680-ton train  
on C. M. & St. P.



## Sliding Contact Used on the World's Greatest Electrifications

What better proof of the practicability of a sliding contact for current collection could be afforded than its use on such work as the St. Paul and New Haven electrifications in America and the Loetschberg-Simplon, and North-Eastern, electrifications in Europe?

On these and other heavy, high-speed electrifications, non-sparking and uninterrupted collection at high voltage or high amperage is essential. Trolley wheels could not be considered for a moment.

## The Miller Trolley Shoe

is the most highly developed and simplest sliding contact current collector produced.

Unlike the sliding bow it consists of a solid, grooved, replaceable contact piece which cannot be sawed through by the trolley wire and hence it is unnecessary to stagger the latter. Unlike the trolley wheel it has no tendency to leave the wire at high speed and cause sparking and burning. For these reasons, and many others, the Miller Trolley Shoe is the

**Ideal Current Collector for High-Speed Lines**

## Miller Trolley Shoe Company

53 State St., Boston, Mass.

Will exhibit at the Atlantic City Convention, Oct. 9-14, Space 361,  
Exhibition Hall, Young's Million Dollar Pier.



## Keep Out Of The Trenches!

In one large city of Southern Ohio it costs 20 cents a cubic yard to shovel out of the trench material dumped therein by inefficient dump cars.

This is but one form of waste labor eliminated by the

### Differential Electric Dumping Car

When a Differential unloads on either side, its overhang is so great that the material is placed not only where you want it—

But also where it will not foul the rails and inconvenience the passenger cars following.

You will want this car for your big Spring drive. Write now for detailed information.



### Differential Car Co., Inc.

GENERAL OFFICES:

141 Broadway, New York

H. Fort Flowers, President and General Manager

Works: Nashville, Tenn.

## IF YOU WANT PROOFS

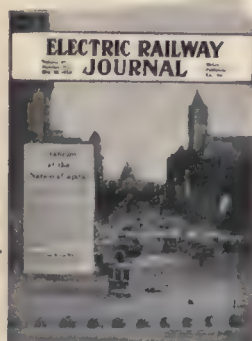
of your advertisements, and time to return them with corrections

### Copy Must Be in Our Hands Two Weeks in Advance of Publication Date

**Copy Changes.** If no proofs are desired your advertisements should be in our hands Wednesday of the week preceding date of publication, otherwise your latest advertisement in accordance with schedule will be repeated.

**New Advertisements** (not changes of copy) can usually be accepted up to noon Wednesday of the week of publication, but no guarantee can be given as to location or proofs or indexing.

**Searchlight Advertisements** (Proposals, Wants, For Sale, etc.) received as late as 10 A. M. Thursday will be published if there is space available in the pages that go to press last. The paper is dated and mailed Saturday.

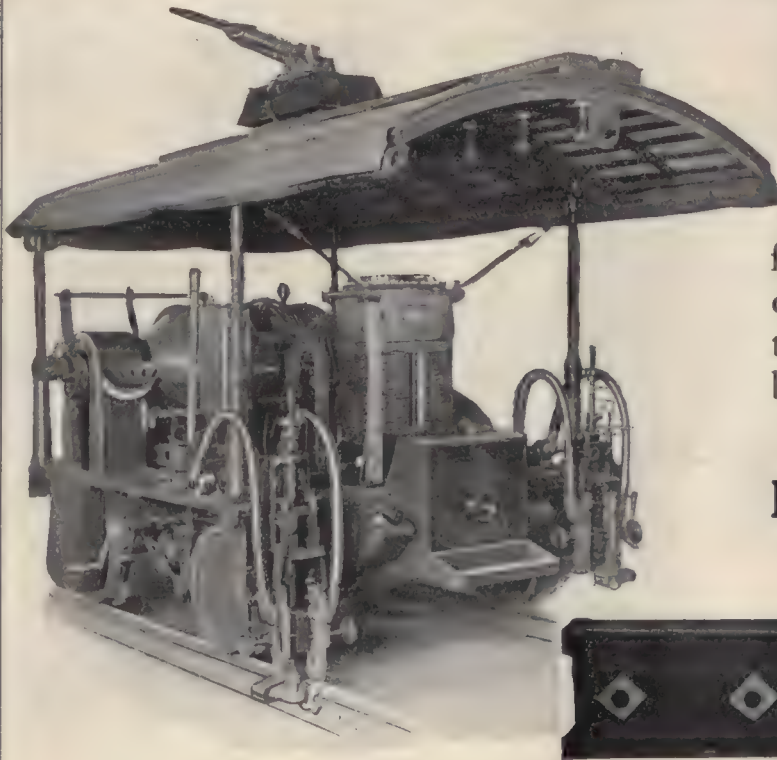


**T**HESE are not arbitrary rules. We do our best to give our advertisers what they want—work overtime if necessary—but each advertising form has to be on the press at a specified time. That is why we cannot guarantee proof or location unless we have copy on time. We want our advertising space to work at maximum efficiency for our advertisers.

The Paper is dated and mailed Saturday

Electric Railway Journal, 239 W. 39th St., New York





## Here's the Bond That Gives—

full 8 to 1 contact area. The car welds the whole side of the terminal to the rail. Don't be satisfied with less.

## Electric Weld Rail Bonds



**The Electric Railway Improvement Co.**

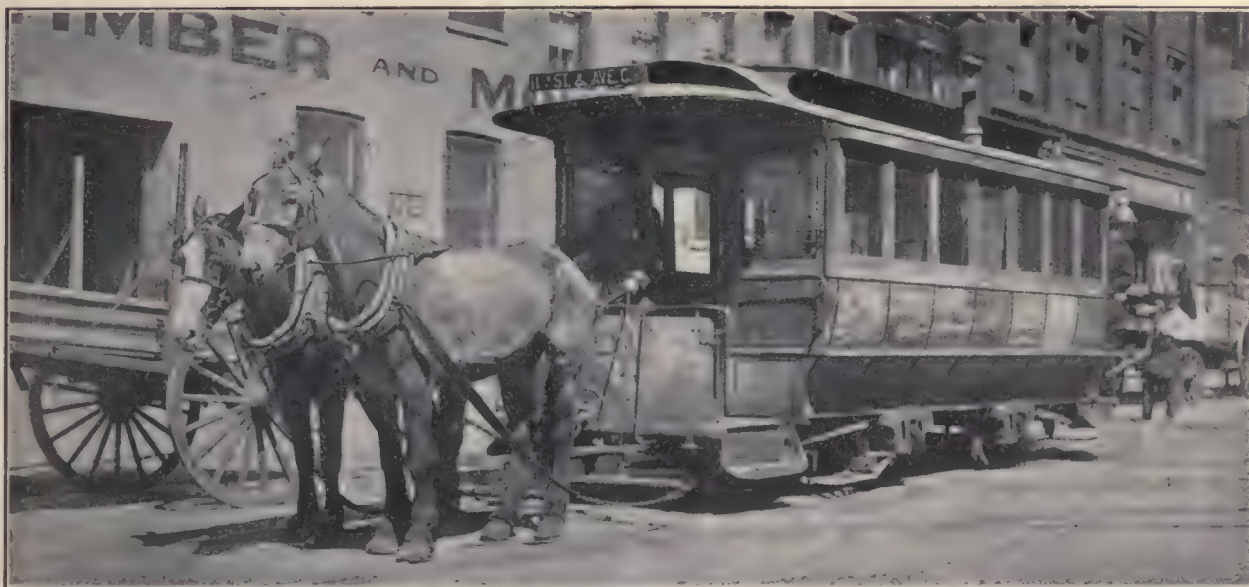
Cleveland, Ohio

## Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy and sell, rent and lease or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have. The cost is a trifle, the results considerable.

**Get your Wants  
into the Searchlight**





## Keeping Pace with the Developments of Two Generations

Horse-car days.

We can all remember the frail little "match boxes" jerking and bouncing along a narrow-gauge "snake-trail" track behind one or two old broken-down cab horses. They tipped the scales at only one or two tons when loaded to capacity, and the speed seldom reached the hair-raising rate of 6 miles per hour.

Yet within this short space of years we have seen the electric car develop into a 60-ton palace, riding as smoothly as thistledown in the air at speeds as high as 70 miles per hour.

Do you fully appreciate the changes of the last 30 or 40 years?

Can you comprehend what this ever-increasing service has demanded of the car wheel manufacturer?

Although the pace has been a hot one, we have never lost our stride, never lagged behind. The Wonderful Single-Service Chilled Iron Wheel was standard in the days of the "hobbie-horse" car, and is standard today with over 90% of the street-car companies of the United States and Canada which operate 100 cars or over.

## ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

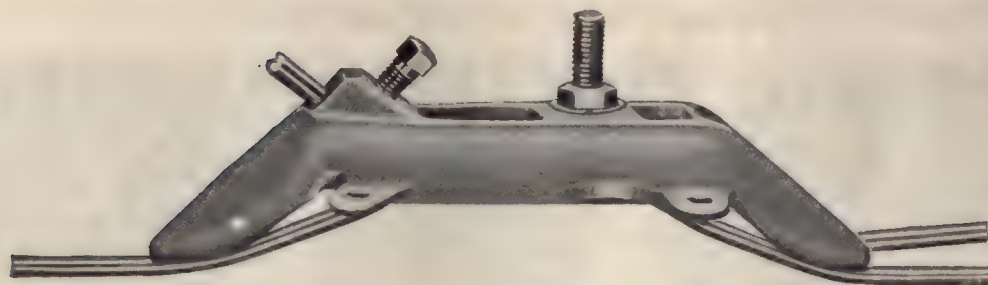
1228 McCormick Building, Chicago, Ill.

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels Per Day



55 Ton High Speed Interurban Service





# A New G-E Trolley Frog

## with renewable pan

The new Form N trolley frog, when once located and the wires fastened into position, requires no further handling of wires and tackle. The body is permanently wired in place and only the pan, which is bolted to the body, need be renewed when worn.

A branch wire may be run through this frog and a guy wire attached to it or the wire may be dead-ended in the clamp as desired. The frog is made in several styles (15° turnout only) as follows:

- Cat. No. 200293.....All iron frog (right hand)
- Cat. No. 200291.....All iron frog (left hand)
- Cat. No. 200294.....Iron body brass pan (right hand)
- Cat. No. 200292.....Iron body brass pan (left hand)

*Ask for Sample*

# General Electric Company

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.  
Charleston, W. Va.  
Charlotte, N. C.  
Chattanooga, Tenn.  
Chicago, Ill.  
Cincinnati, Ohio

Cleveland, Ohio  
Columbus, Ohio  
Dayton, Ohio  
Denver, Colo.  
Des Moines, Iowa  
Duluth, Minn.  
Elmira, N. Y.  
Erie, Pa.  
Fort Wayne, Ind.  
Hartford, Conn.  
Indianapolis, Ind.

General Office: Schenectady, N. Y.

ADDRESS NEAREST OFFICE

Jacksonville, Fla.  
Joplin, Mo.  
Kansas City, Mo.  
Knoxville, Tenn.  
Los Angeles, Cal.



Louisville, Ky.  
Memphis, Tenn.  
Milwaukee, Wis.  
Minneapolis, Minn.  
Nashville, Tenn.

New Haven, Conn.  
New Orleans, La.  
New York, N. Y.  
Niagara Falls, N. Y.  
Omaha, Neb.  
Philadelphia, Pa.  
Pittsburg, Pa.  
Portland, Ore.  
Providence, R. I.  
Richmond, Va.  
Rochester, N. Y.

St. Louis, Mo.  
Salt Lake City, Utah  
San Francisco, Cal.  
Schenectady, N. Y.  
Seattle, Wash.  
Spokane, Wash.  
Springfield, Mass.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
Youngstown, Ohio

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, SEPTEMBER 2, 1916

No. 10

## **BRINGING PUBLIC RELATIONS WITHIN REACH**

Of all the subjects that are difficult to make concrete and tangible, one of the worst is public relations. This term has been applied to a very complicated set of conditions, and it is as yet far from exact definition. Like others vitally interested in the electric railway industry, the editors of the *ELECTRIC RAILWAY JOURNAL* have endeavored to visualize the subject somehow so that it could, as it were, be brought down out of the clouds within reach from the ground. The natural result of this endeavor has been the preparation of an outline, at first without the idea of publication. It was later considered, however, that others might find such a compilation useful, and it is printed on page 386 in this issue for convenience of reference. The outline attempts to list answers to the "Why" and the "How" of public relations. It is not put forth as a complete syllabus but is tentative and suggestive only. In stating that public relations need definition, we do not refer to that friendly attitude or state of mind which is necessary on both sides if relations between any two parties are to be pleasant and profitable. That such a state of mind must exist goes without saying. What we do refer to are the factors which go to produce this attitude. There is no more important study to which managers can address themselves than to that of these factors. The basis of this study must be the truism that no transactions can be carried on continuously that are not profitable to both parties. The managers have then two big tasks: to insure the twofold profitableness of their business, and to convince the public of the exact conditions surrounding this business.

## **ELECTRIC ROADS IN THE PRESENT STEAM CRISIS**

The crisis in the steam railroad strike brings to the forefront, of course, the very serious question of what the public will do for its transportation in case there should be a serious interruption of service on the steam railroads next week. Among the substitutes, that which promises to be the most useful in this emergency are obviously the electric railway systems of the country. The electric roads are by no means as extensive, measured in aggregate amount of track, as the steam railroads, there being only about 46,000 miles of electric railway track in the United States as compared with some 387,000 miles of all kinds of steam railroad track. The electric roads also cannot approach the steam railroads, of course, in speed or weight of trains. Nevertheless, during the past fifteen years, many miles of electric railway track have been built connecting the larger cities of the country, and it is

very probable that in case of serious impairment to the service of the steam railroads owing to strikes, the electric roads can be of great assistance to the public in the transportation of both passengers and freight. It is in the north central states that the interurban electric railway business has received its greatest development. Thus, between Buffalo on the east and St. Louis on the west, and between the Ohio River on the south and the middle of Michigan and Wisconsin on the north, there is a network of connecting electric lines most of which are now doing considerable freight business in standard freight cars, in addition to a very large passenger business. In the Eastern states the number of high-speed electric interurban lines which have been built is not so large. Nevertheless, it is possible to travel from Washington, D. C., to Portland, Me., and beyond by electric cars, as well as practically all the way across New York State, and most of these electric railway companies in the East also do a freight business, although not on so extensive a scale as those in the central states. The traveling will be slower than on the steam railroads in most cases, but there is no doubt that the electric lines will be able to help out greatly both in passengers and freight in case the nation-wide strike occurs, not only in short distance travel, as in carrying steam railroad commuters in the neighborhood of the large cities to and from their business, but even in through service to a considerable extent as well.

## **EMPLOYEES BEHIND THE SCENES**

The general public has little conception of the varied classes of employees, apart from those engaged in the car service, who are required to carry on the affairs of a large electric railway system. Occasionally a group of linemen or trackmen is noticed and now and then a glimpse is had of a few power plant or substation employees, but the great body of patrons sees little of any but uniformed men. A suggestion of the large number of employees who work behind the scenes, as it were, on a large urban system, is found in the recently printed agreement of the Boston (Mass.) Elevated Railway and the Amalgamated Association as to wages and working conditions. Among these are no less than fifty-two blacksmiths and horseshoers, twenty-one blacksmiths' helpers, five brass finishers, two harness makers, ten masons, 103 machinists, thirty-four outside carpenters, seventy-five painters, two plumbers, four riggers, eight roofers, eight steamfitters, thirty-one structural iron painters, forty wiremen, 216 woodworkers, forty-nine armature room workers, two boiler



room engineers, sixty firemen, five hoisting engineers, 162 mechanics, eighty-three oilers, 183 carhouse repairmen, 267 car cleaners, thirty-six switchboard operators, twenty car shifters, seventy-eight power station men, twelve stock room clerks and many other classified workmen. Here are more than 1500 employees whose pay ranges roughly between 20 and 41 cents per hour, the great majority of whom the traveling public never recognizes as on the electric railway payroll, but who, with their dependents, represent a pretty substantial community. These figures do not show the actual percentage of what might be called non-transportation employees in the company's service, who total approximately 4000 out of roughly 10,000 on the entire payroll. It would be incorrect to say that for every motorman or conductor, guard or brakeman in the service another employee is engaged in collateral or auxiliary duties, but something like this expresses the relationship between the blue uniform men and the other employees, in a rough sort of way. When occasion permits, it is a good thing for a local public to be given some idea of the other side of the organization from that which is visible, as a means toward a better appreciation of the magnitude of the problem which the utility in question is trying to solve.

#### EDUCATING THE PUBLIC

The policy of this paper, in common with that of most of the progressive railways, is strongly in favor of publicity. Fresh evidences arise every day to indicate the necessity for continuous and patient presentation of the street railways' problems to the public.

A short while ago a street railway man was riding in a city street car in company with a man who held an official position of responsibility with a small savings bank in the city. In the course of conversation, the banker criticized the service of the company and expressed his belief that it should be obliged to purchase more modern and comfortable cars than those in use on the particular line on which they were riding. As a matter of fact the cars were poor and fully deserved the criticism. The service was about average, being neither very good nor very bad, as urban traction service goes.

The street railway man turned the conversation to matters of more immediate concern from the viewpoint of a banker and began to discuss the subject of investments. Within a few moments of his condemnation of the obsolete cars, the banker was telling the other man that his bank had refused to purchase a part of a new issue of bonds which that particular electric railway company had just attempted to float. The obvious reasons for the bank's attitude in this case was, of course, that they were not satisfied that the loan would be a safe one, despite the fact that the company in question is both conservatively financed and efficiently managed.

Just how this banker, as an ordinary citizen and user of the street cars, thought that the street railway could buy new cars when the banks would not loan it new funds for additions and betterments, is not clear. Of

course the real fact was that he never stopped to consider the railway's problem in just that light. As a man acquainted with business and financial matters, we might expect him to know better. The question is that when a man in that position does not understand nor stop to consider the fundamental economic side of the question, how can the average clerk, mechanic, laborer and professional man be expected to appreciate it?

It seems clear that it is not only to the advantage of the street railways that they should seek to make these mutual problems more public, but that it is almost a necessity for them to do so. As to whether the publicity should take the form of paid advertisements in the newspapers, notices in the cars, lectures to civic associations or any other way, is a matter of local policy. The broad underlying principle is that if the street railway wants the public to deal reasonably and patiently with it and to make allowances for its financial and operating difficulties, it must at least make the public acquainted with the fact that such difficulties exist and that the fault is not wholly on the side of the company.

#### SHORT RIDES BY JITNEY

Within recent years organized labor, through its leaders, has been closely studying the businesses from which its members draw their livelihood. In most cases this study has been prompted by a desire to ascertain the most effective and destructive methods of waging labor wars, and as advancing civilization develops new methods they are pressed into service, just as the European antagonists utilize the latest discoveries of science in their warfare on each other.

A case in point is described in an interview with an official of an electric railway labor organization, as reported in a Philadelphia newspaper recently, in which a new plan of campaign, to be followed in prosecuting the strike recently declared against the street railway company in Harrisburg, Pa., is outlined. As a matter of fact, this strike has been a failure. The cars are running again on the regular schedule, and traffic is approaching normal. The loss in travel now concerns only those workers in industrial plants whose action can be controlled through the channels of organized labor. Such people have been patronizing the jitneys. The interesting feature concerning the recent pronouncement in the Harrisburg case relates not to the strike, which the company has won, but to the prosecution of a guerrilla warfare after the main issue has been settled.

The labor union representative in this case announces that efforts will be directed to divert the short haul rider because, as he states, this is the profitable portion of the business. As every operating official knows, it is, moreover, the only portion of the business which can be handled by the jitneys without bankruptcy to themselves. On the other hand, organized labor is to encourage workmen to ride on the electric cars for long distances because, as is stated, the larger the number of people who take the long, unprofitable rides, the more money the company will lose. It



remains to be demonstrated, of course, how completely will be the control which the affiliated labor organizations can exercise in carrying out such a plan of campaign. It will require considerable instruction to workmen to enable them to segregate the unprofitable from the profitable rides. It is doubtful in most cases also whether the men would take the trouble to differentiate, even if they could.

At first glance, these tactics appear to contain a new menace to the electric railway. In the long run, however, we venture the prediction that education of this character will be helpful. If the day laborer and the skilled mechanic can be educated to the point where they realize what portion of the electric railway business is unprofitable, the information will become common property. The labor unions will find that their campaign of education has been a boomerang, for instead of hurting the companies it will, in the long run, inure to their lasting benefit.

#### SAVING POWER ON SMALL ROADS

If the papers presented at recent railway association meetings may be considered as "the straws that show which way the wind blows," there is a rapidly increasing tendency to use devices which promote the more intelligent use of equipment by motormen. Much has been published in these columns and elsewhere dealing with the theory underlying the use of such devices, and operating data representing the experience of a number of roads have been presented. Possibly, a part at least of what has been published has not been of much interest to the men who actually "run the cars," because of the technical style in which it has been written. In an article in this issue, William Arthur has stated the fundamentals of energy saving in plain every-day English. The advantages that arise both directly and indirectly from the use of energy-saving methods are pointed out, and the necessity for a fair basis for comparing the performances of the various motormen operating like cars in similar services is emphasized. He has also formulated some simple rules for "power saving," copies of which, placed in the hands of car crews, might be made the basis of an energy-saving campaign.

Many small street railway systems cannot afford—or at least feel that they cannot—the more elaborate and satisfactory apparatus and the organization necessary to secure the best results obtainable therewith. Published reports indicate, however, that on elevated roads even so simple a device as the coasting board may reduce the energy consumption 5 or 10 per cent. While elevated roads, with their fixed stopping points, afford better opportunities for the effective use of such devices than the small street railway, some saving on the latter might be effected by the use of boards or some other cheap and simple device. If boards are used it would not, of course, be necessary to locate one at every stopping point, but locations should be made at down-grade sections of track and at points where stops are frequently made. For such a device the cost in maintenance would be low, and the close personal contact between motormen and their superior officers, the absence of extremely

heavy rush-hour traffic, and the easy schedules usually maintained on small systems would tend to make the saving, expressed in percentages, comparable with those obtained on elevated roads.

There is no doubt of the widespread existence of energy-saving opportunities on large and small roads alike. The seizing of these depends upon intelligent co-operation between the men on the platform and the men in the office. The latter must furnish the former with the knowledge and the incentive to expend the electrical energy produced or purchased by the company with the same care that he spends his own cash.

#### RECONCILING WHEEL AND RAIL CONTOURS

An inconspicuous statement of fact in the report of the work done by the Engineering Association committee on standards at the recent meeting in New York City, when considering the proposed revised standards for wheel tread and flange contours, showed that this committee appreciates the necessity of the joint action of the equipment and the way committees in arriving at a standard wheel contour. Wear on both the wheel and the rail is dependent absolutely on the line of rolling contact, and if the maximum wear life is to be obtained from both, it is very necessary that the line of contact between the wheel and the rail provide as nearly as possible a full tread bearing particularly in street railway service. The standards committee therefore is to be commended for requiring that the differences between the equipment committee and the way committee regarding wheel tread contours and rail head contours be reconciled.

The recent article by R. C. Cram on curved heads for grooved-girder rails in Brooklyn, N. Y., undeniably showed that the rate of rail head and wheel tread wear was increased by load concentration. To remedy this difficulty, he proposed a curved-head rail, which would provide a full wheel tread line of contact on average worn wheels. Such a move solves the problem so far as grooved-girder rail is concerned, but the application of a curved head on a plain girder or T-rail produces an unbalanced section, and obviates one of the greatest advantages of this type of rail, namely, that it is a symmetrical section thus making either side the gage side.

C. H. Clark, engineer maintenance of way Cleveland (Ohio) Railway, has been able, however, to provide a full line of contact between the wheel and the plain girder rail by tilting the axis of the rails inward until they are practically at right angles to the wheel tread slope. No particular difficulty was experienced in tilting the rail at this angle because Mr. Clark builds his track on steel ties and arranges with the manufacturers of these to bend the ends so that they will tilt the rail at the correct angle to the wheel. Some of this tilted-rail track has now been in service more than a year, and from the beginning of service, the area of wheel and rail wear indicated that a full line of contact was being obtained. The method employed in Cleveland and the one suggested by Mr. Cram show that the way engineers appreciate the value of a full line of contact between the wheel and the rail.



# Improvement of Public Relations

## Outline of Some of the More Important Methods of Bettering the Relations Between the Railway Company and the Public

**D**URING the last few years electric railway companies have been paying a great deal of attention to methods of improving their relations with the public which they serve, and many articles have been written on the subject. To aid in the study of this subject the following outline has been prepared of the objects of establishing good public relations and of some of the methods by which this result can be accomplished.

### OBJECTS OF ESTABLISHING GOOD PUBLIC RELATIONS

- (A) To secure the maximum patronage.
- (B) To secure good treatment and popular support:
  - (I) When questions of fare increases or service changes arise.
  - (II) When questions of franchise extensions or alteration of franchise conditions arise.
  - (III) When labor difficulties confront the company.
  - (IV) When accident cases are being tried by jury.
  - (V) When competition of any kind threatens.
  - (VI) When discriminating taxation is imposed.

### METHODS OF ESTABLISHING GOOD PUBLIC RELATIONS

- (A) By giving as good service as the rate of fare warrants.
- (B) By having a clean internal corporate history as regards finances and relations with labor.
- (C) By convincing a large majority of the public that this is the case.
- (D) By having the city or a considerable number of the citizens interested financially in the enterprise.

- (A) A company tends to give as good service as the rate of fare warrants:

- (I) Through having the franchise conditions fair to the company:
  - (a) By having a long-term or indeterminate franchise.
  - (b) By reducing the burdens under the franchise which are not directly reflected in service (such as pavement charges, excessive taxes, etc.).
  - (c) By providing an extra fare zone for very long distance riders or possibly charging for transfers.

- (II) Through introducing all possible economies in the service, compatible with good service:

- (a) By studying the practice of other companies and applying the lessons thus learned where suited to the case.
- (b) By employing competent engineers and transportation officials, yet not letting administration expenses become excessive.

- (III) Through providing attractive, comfortable and sanitary cars and equipment and safety features for the protection of passengers:

- (a) By maintaining a high standard of maintenance for track, cars and other equipment, so that breakdowns are infrequent and cars are always clean.
- (b) By purchasing new equipment as a substitute for old equipment when conditions warrant.
- (c) By paying regard in new and old equipment to the features that directly affect the public, like comfortable seats, good heating, lighting and ventilation, attractive exterior and interior finish, adequate and neat car designs, easy riding track, tasteful overhead work and buildings.
- (d) By the adoption of inclosed platforms and other approved safety devices.

- (IV) Through providing competent and courteous train crews:

- (a) By paying a fair wage and requiring only reasonable hours.
- (b) By exercising care in the selection and training of employees.
- (c) By employing superintendents who will administer discipline impartially but sympathetically so as to stimulate loyalty in the force.
- (d) By special instruction on the subject of neatness and courtesy to old and new men.
- (e) By having the company officials set examples of neatness and courtesy for the men.
- (f) By interesting the employees in the financial results of the enterprise:
  - (1) By adopting a bonus scheme based on individual performance.
  - (2) By basing the wage rate on the gross or net receipts.
- (g) By conducting welfare work:
  - (1) By club rooms, reading rooms, restaurants, etc.
  - (2) By pensions for superannuated employees.
  - (3) By mutual benefit associations.
  - (4) By co-operative buying.
  - (5) By presents to the men at Christmas or other stated occasions.



(V) *Through fulfilling other obligations, expressed or implied, that the company owes to the public, such as in the matter of:*

- (a) Suitable operating schedules.
- (b) Maintenance of paving.
- (c) Willing settlement of just damage claims.
- (d) Prompt payment of taxes.

(B) A company can have a clean internal corporate history as regards finances and relations with labor:

(I) *Through publishing adequate reports for stockholders:*

- (a) By giving detailed financial statements, in comparative form so as to make examination of old reports unnecessary.
- (b) By neglecting the whims of individual auditors and using the official classification so as to permit of ready intercompany comparisons.
- (c) By avoiding such meaningless expressions as: "The property has been well maintained during the year."
- (d) By informing the stockholders as to any unusual actions of the board of directors and in general giving them, besides the annual reports, enlightening communications during the year on matters affecting the company.

(II) *Through avoiding even the suspicion of secret deals with politicians:*

- (a) By explaining fully to the stockholders all unusual financial items.
- (b) By insisting that the public be admitted to franchise and similar hearings.
- (c) By appealing to the public directly in case the city council declines to act in such improvements as skip-stops, rerouting of cars, near-side or far-side stops, etc.

(III) *Through establishing adequate depreciation accounts:*

- (a) By determining through competent authority the depreciable life of the items of property.
- (b) By maintaining a property ledger showing a continuous inventory with a complete depreciation record.
- (c) By co-operating with regulatory bodies in formulating official rules for depreciation accounting and following them when issued.

(IV) *Through paying the employees fair wages and treating them fairly and liberally along welfare lines, as explained under A IV.*

(C) A company can convince a large majority of its public in regard to its clean history:

(I) *Through a proper method of newspaper publicity:*

- (a) By having a publicity agent or a designated official in direct charge of press relations.
- (b) By voluntarily furnishing the newspapers through such an official with financial, operating and general data of interest to the public.

(c) By giving reporters an opportunity to inspect improvements, new equipment, etc., and furnishing them with complete facts in regard thereto.

(d) By giving reporters prompt and explicit information on points which they themselves raise.

(e) By having occasional articles written by company officials on matters about which the newspapers desire full information.

(f) By publishing occasional advertisements on:

- (1) Questions before the public.
- (2) Problems in the industry.
- (3) Announcements of fare and schedule changes, new service, etc.

(II) *Through having the leading officials prominent in local affairs as a result of:*

- (a) Active membership in civic associations and town improvement organizations.
- (b) Co-operation with the local board of trade.
- (c) Membership in social clubs.

(III) *Through having its officials recognized as men on whose word the public can rely, as a result of:*

- (a) Frank explanations of company policies.
- (b) Honest criticisms of and efforts to avoid corporate evils.
- (c) Refusal to act under cover at any time.
- (d) Insistence upon the rigorous keeping of all promises to the employees and the public.

(IV) *Through treating the complaints of the public courteously:*

- (a) By having a definite and tactful officer of the company to handle complaints.
- (b) By giving him ample authority to settle minor complaints and full information for overcoming unjust complaints.
- (c) By having him arrange in the case of major complaints a direct approach without delay to the responsible higher official.
- (d) By instilling in this higher official a sense of his duty in standing ready to serve immediately in such cases.
- (e) By having complaints solicited by newspaper, placard or billboard advertising, house-to-house canvasses or car canvasses, and having them adjusted promptly wherever possible.

(D) A company can have a considerable number of the citizens interested financially in the enterprise:

(I) *By encouraging local investment in its securities:*

- (a) By making some of its securities readily available to the local public through the company's own offices or through local banks.
- (b) By issuing the securities in small denominations.
- (c) By permitting the purchase of the securities on a partial-payment basis.

(II) *By having a profit-sharing agreement with the city.*



## Signals on the Scranton & Binghamton Railway System

Performance Records Show That This Road's Signal System, Which Is Used To Direct Train Movements as Well as to Protect Them, Provides a High Degree of Reliability, the Average Number of Causes of Interruption being One in 37,000 Signal Movements.



SCRANTON & BINGHAMTON SIGNALS—INTERMEDIATE SIGNAL

**S**INCE the Scranton & Binghamton Railway developed its method of operation by signal indication, as described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 3, 1914, the degree of success accompanying the operation of its signal system has been subject to much discussion, owing to the use of signals for the direction of trains as well as for their protection. In the accompanying paragraphs there is published a complete record of the signal performance extending over six months, including last winter. This shows that the signals have behaved in a thoroughly normal manner, an average of twelve out of 3000 trains operated being delayed during the course of a month because of the safeguards imposed by the signals. The average delay from this cause was three minutes per train.

As might be expected in an installation where so many movements are made, there have been false-clear indications, one of them appearing during the period covered by the record herein published. Yet in no case has any such failure been accompanied by circumstances that made a collision a possibility.

This disposes of the argument that, under this method of operation, a false-clear indication would be certain to result disastrously if the train movements were not controlled primarily by train orders. As a matter of fact, in no case has a false-clear indication caused a train even to enter an occupied block, but in every instance thus far the failure has been immediately caught by some employee who observed the improper position of the semaphore at the end of the block as the train left it.

During the period covered by the records the railway's schedule called for a thirty-minute service in each direction from Scranton to Brookside, which includes about 8 miles of signaled territory, while on the rest of the signaled road the service was hourly. The road and its signal system are in operation for twenty-one hours each week-day and for twenty hours each Sunday.

The signaled territory under consideration covers 22.8 miles of single track divided into eighteen blocks. Each block is arranged to include the track between a pair of passing sidings, the latter being located at intervals of about 1 mile. The home signals at each siding are of the semaphore type, and two intermediate signals of the light type are installed at about the center of the block. In general, the signal arrangement is that of the Union Switch & Signal Company's T. D. B. system with the exception that "direction indicators" have been added. The latter device is a normally unlighted, or dark, single-lens light signal mounted on a pole a short distance beyond each semaphore signal governing entrance into a block. When a train enters the block this signal will display a white light if (a) the direction controlling relays have established the proper direction of traffic for the movement of this train and (b) the semaphore signal in the rear of this train has gone to the stop position.

Motormen, therefore, are required to obtain the indication of a clear semaphore signal to enter a block, and they must have a lighted direction indicator to proceed through the block to the intermediate signal. Only one of the two direction indicators for a block can be lighted at any one time. If a train should enter one



end of a block simultaneously with another train at the opposite end, one of the two would be prevented from running into the block as far as the intermediate signals before being stopped, as would be the case with a standard signal arrangement.

Trains are permitted to advance meeting points on the authority of a clear home signal supplemented by the direction indicator and are required to wait at a stop signal for a period of time sufficient to allow an opposing train to get through the block, after which, if the signal remains at stop, the waiting train may flag itself to the next home signal in advance. In case of an extended interruption, the trains are moved by time card and train orders issued from the operating office at about the center of the line, this office being con-

The data given in Table I cover a six-month period beginning with September, 1915. The record for that month, it may be said, was an unusually unfortunate one. In practically every case of deranged signals a considerable time elapsed between the occurrence of the interruption and the restoration of the normal operation of the signals, and to this may be ascribed the larger number of interrupted signal movements which appear in the table for this period.

During the month there were six interruptions, of which one was due to the grounding of the signal mains because a broken lighting wire connected them to a telephone line. This occurred at night, and some time elapsed before the cross was located and repaired. Another of the interruptions was due to lightning, which



SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL AT PASSING SIDING

nected by telephone to the various points along the line. The feature of the operating methods, therefore, is not the elimination of the dispatcher—for whom an equivalent is provided in cases of emergency—but rather the advancement of meeting points under clear signals. A great many delays are thus eliminated.

#### RECORD OF INTERRUPTIONS

The record of "causes of signal interruptions," which is shown in the accompanying table, averages one cause of signal interruption to 37,000 signal movements, or three and one-third causes of interruption per month. A cause of signal interruption, it may be said here, is defined by the railway company as a derangement of the signal system in which one or more signals fail to give the proper indication. This should be differentiated from the "interrupted signal movements," resulting from causes of signal interruptions. One cause of interruption for one signal, if it is not promptly remedied, may produce a large number of interrupted signal movements, the record of the latter showing operating conditions, while the former covers only signal line, apparatus, track and maintenance conditions. Thus, in February, 1916, four causes of signal interruptions resulted in sixteen interrupted signal movements, delaying eight trains for twenty-six minutes. A little consideration will show that this information does not give the number of times that trains passed deranged signals, as those data were not considered essential for the purpose of securing an operating and signal efficiency record. A signal failure is considered only as the action of a signal in which a false-clear indication is given.

blew a high-tension fuse and affected a number of signals. A third interruption, which affected one signal for forty-five minutes, was caused by high voltage at the power house, which so affected a semaphore signal just starting to clear that a motor circuit controller was broken, and the signal failed to make the movement to the clear position.

During September, also, one power failure occurred, this being caused by a badly worn dog in a power-house circuit breaker which allowed the circuit breaker to open the primary power circuit, affecting all signals until repairs were made. Another of the interruptions was brought about by a short-circuited track section, which put one block out of commission for about four hours. This was caused by a track laborer, who, in driving a staple, so bent it as to cross certain power and

TABLE I—SIGNAL OPERATING RECORD—SCRANTON & BINGHAMTON RAILWAY

	Sep- tember 1915	Oc- tober 1915	Novem- ber 1915	De- cember 1915	Jan- uary 1916	Feb- ruary 1916
Signal move- ments .....	124,429	125,919	129,000	123,054	122,399	114,946
Causes of sig- nal interrup- tions .....	6	3	0	2	5	4
Signal failures Interrupted sig- nal move- ments .....	1	—	—	—	—	—
Trains oper- ated .....	217	36	0	9	59	16
Trains delayed Total minutes delay .....	3,273	3,370	3,168	3,276	3,259	3,060
Signal move- ments per in- terruption ..	36	14	0	4	12	8
Train move- ments per train stop...	82	46	0	8	51	26
	20,738	41,973	—	61,527	24,479	28,736
	91	241	—	819	272	382





SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL WITH DIRECTION INDICATOR TWO POLES IN ADVANCE

track circuit cables. The sixth interruption for the month was caused by blasting in a quarry near the line, flying stones breaking the 2200-volt signal main and shutting down the signals until the line was coupled up.

#### RESULTS OF BAD RAIL CONDITIONS

During the month of September, also, there appeared a false-clear indication. It was caused by bad track conditions at a point where the railway runs at one side of a turnpike. Here, the low rail was covered for some distance with dirt that evidently had been thrown by an automobile running close beside the rail. This practically insulated one of the rails from the car, preventing shunting, and the block cleared while a train was stopped on this section of rail. The improper action of one of the signals was reported by the motorman, but as a matter of fact passing cars cleared the rail of most of the dirt and corrected the condition, the trackmen completing the cleaning. This signal failure, it may be said, was the only one to occur during the six months of operation under consideration here, during which time there were 739,747 signal movements.

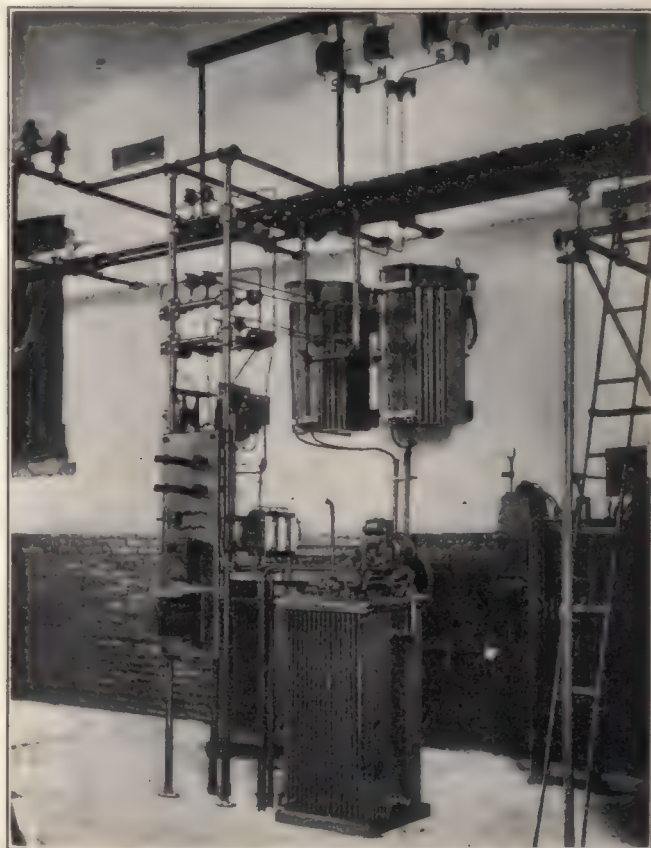
The difficulty of keeping the surface of the rail clean in those sections of track which lie alongside the turnpike mentioned was in evidence also during the month of October, when two signal interruptions occurred on successive days because of bad rail conditions. At that time the turnpike had been heavily oiled to lay the dust, and the mixture of oil and dust was carried by wagon wheels onto the track at a crossing, thus insulating the rails from the car wheels at two points. In the case of one signal interruption, a car using power over a crossing upset the balance of current flow between the two rails and blew the fuse on the track side of the relay at the nearest signal. The other interruption, primarily due to this cause, was brought about by the fact that the partly-insulated rails caused an abnormal number of partial movements of a semaphore signal with such rapidity as to cause injury to certain contacts. This left the signal in stop position and prevented it from clearing until repaired. Neither interruption involved any great waste of time in the actual clearance of the difficulty, but in each case there was some delay in getting word of the difficulty to the signal maintainer. This resulted in one interruption causing a shutdown of the signal for about two and one-half hours, and in the other case forty-five minutes.

The third interruption that occurred during the month of October resulted in a similar effect on a signal, and was caused by a car moving slowly in a certain portion of a block under conditions such that a large number of partial track relay movements were produced. Subsequently, improvements were made in the motor circuit controller so that it would be better able to stand the strains. After a time test of this improvement, all of the signals had their controllers changed, and interruptions from this cause ceased.

During the month of November there were no interruptions or failures of the signal system, the operation being 100 per cent perfect. In December, however, there were two interruptions, one being caused by poor contacts in a control mechanism, and the other by a flaw in the metal of a brake stud which, by repeated abnormal movements of the signal mechanism, broke a pin that fastened a gear to its shaft and prevented the signal from clearing. The latter interruption lasted two hours, but since only one signal was affected the number of interrupted signal movements was small.

During the month of January, 1916, five interruptions took place. Two of them were due to trouble with the signal lines, one being a break in the 2200-volt main and the other being due to a short-circuit of a control wire with a 600-volt feeder, burning out the lamps in an intermediate light signal as well as a relay. During this month, also, there were two failures of one relay, which gave trouble intermittently for several days and which had to be replaced. The difficulty was found to be due to badly worn back contacts in the relay. Intermittent trouble also developed in one of the insulated track joints. This was traced to original but unnoticed faulty assembling, which brought about intermittent short-circuiting at the joint.

During the month of February two of the interruptions were due to snow and ice on the rail. This caused abnormally frequent movements at two signals and broke



SCRANTON & BINGHAMTON SIGNALS—VOLTAGE REGULATOR IN POWER HOUSE





SCRANTON & BINGHAMTON SIGNALS—SWITCH INDICATOR AT OUTLYING PASSING SIDING

certain connections in the signal mechanisms, thereby preventing them from clearing. The other two interruptions during February were due to wrong connections made by a lineman in repairing broken line wires.

From the foregoing detailed account of the signal interruptions it will be seen that of the twenty interruptions that occurred during the period under consideration four were chargeable to the line department. The signal department is charged with eight, of which some might have been prevented while others could not have been avoided. Two interruptions were chargeable to the power department, and one each was due respectively to unavoidable causes and defective materials. Two interruptions were caused by defective track circuits and two to bad track, the latter condition being responsible also for the one signal failure that occurred.

#### VOLTAGE REGULATION

Reference was made in one of the preceding paragraphs to the use of a voltage regulator. This device was introduced for the signal system because of the fact that the railway company's power house, which supplies both lighting and railway power, is subject to violent fluctuations of load that make it difficult to maintain an even voltage. In consequence, the 2200-volt signal mains are fed through a regulating transformer, as shown in one of the accompanying illustrations, the secondary coil being shifted in accordance with the direction of rotation of a small motor mounted above the machine and operated by the current flow induced by changes in the primary voltage. The device has been in operation for a number of months, and it maintains the voltage of the signal mains practically constant at all times, the maximum variation being between  $108\frac{1}{2}$  and  $111\frac{1}{2}$  volts.

The primary object for the installation of this regulator was to obtain more constant voltage on the 2200-volt line. Prior to the installation of the regulator, the variable load on the generators caused such wide variation in the voltage across the terminals of the lamps in the light signals as to decrease their visibility on the low voltage, and to decrease the life of the lamps on the high voltage. With the installation of this regulator it was possible materially to increase the sensitiveness of the track circuits to the presence of a high resistance shunt, such as would be encountered when a car passed over particles of dirt on the rails or when the car ran over a stretch of rusty rail.

Prior to the installation of the regulator, the track circuits were adjusted for satisfactory operation of the relays on the lowest potential on the signal mains. The relays, of course, were considerably over-energized when the potential on the signal mains assumed its highest value. Naturally, even though the shunting was sufficient on the lower value of potential, the relays would be more difficult to shunt on the higher potential. By a combination of circumstances, a car on a track circuit which had considerable dirt on the rails resulted in the one signal failure described above. The relays on the lower potentials were sufficiently sensitive to shunt even with some dirt on the rail so that it may be said that this voltage variation has been the one cause of signal failure since the signals were installed, aside from the track conditions to which reference has previously been made. Naturally, since the regulator has been installed, all of these difficulties have disappeared.

#### SIGNAL LAMP RENEWALS

In the territory protected by block signals there are thirty-six semaphore signals and thirty-six intermediate signals of the light type. Each of the semaphore signals is equipped with two lamps in multiple, making a total of seventy-two lamps for the semaphore signals. The light signals have two separate lights, one red and one green, and as each one has two lamps in multiple there are 144 lamps for the intermediate signals. Near the entrance to each block, also, there is installed the direction indicator, which is equipped with two lamps, thus adding seventy-two more lights, and this gives a total of 288 lamps on the block-signal territory.

This number of lamps involves somewhat less than 9000 lamp days during the course of a month, and the average number of lamp burnouts per month during the period under consideration was two and two-thirds. Of course, this figure includes all burnouts whether or not they were the cause of signal interruptions. As a matter of fact, none of the signal interruptions during the period under consideration was due to this cause.

#### MAINTENANCE ORGANIZATION

The signals are maintained by a signal supervisor, who devotes only part of his time to this work, as he has charge also of the crossing bells, power wiring, repairs to motors and wiring about machines that are used in connection with the railway company's general lighting and power business. Reporting to the supervisor is a repair man who looks after crossing bells, passenger station lighting and light repairs to the overhead construction and trolley wire, and although he is really a lineman he devotes a part of his time to the signal maintenance and repairs. Whenever heavy work is required on the signals the line gang is called upon, this being a construction gang that is engaged in erecting overhead construction for the extensions of the road which are now being built.

Operation on the Scranton & Binghamton Railway is in charge of R. W. Day, general manager; R. L. Koehler, general superintendent; J. C. Meixell, superintendent of transportation; W. R. Hornberger, signal supervisor, being directly responsible for the operation of the signal system.

In the first three months of 1916 there were in Los Angeles, according to the traffic bureau of the police department, 1840 vehicle collisions, in 1224 of which it is charged that the drivers were guilty of an infraction of some traffic ordinance. There were 389 injuries reported from these accidents, among which were 126 serious injuries and twenty-two deaths. In accidents involving pedestrians their own negligence was responsible for 50 per cent of the injuries received.



# The Present and Future Development of Interurban Railways

By F. W. DOOLITTLE

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IN the development of public utilities it is hard to find an instance where any project, so valuable to the community served and in general so well conceived and constructed under such apparently favorable circumstances as the interurban railway, has resulted in so many cases so disastrously to those who have engaged therein. In any new work there must be cases where human foresight is defective and where the future fails to develop the promises of the early years, but the distressing frequency with which the foreclosures and reorganizations with the accompanying shrinkage of investment have occurred in the history of electric interurban railways indicates that the early investors were unusually optimistic and not sufficiently aware of the hazards of their undertakings. In view of this situation it will be of interest to examine the facts as to the economic status of the interurban railway and its history from the standpoint of a commercial enterprise.

The primary purpose of the electric interurban railway is to provide transportation for people and for commodities and not to serve as an agency to develop communities. In so far as the development of communities may be accompanied by an increase of traffic sufficient to warrant the years of unremunerative operation, a private company is justified in devoting its funds to this purpose, but to project lines on the basis of community development alone is to doom the enterprise to failure and to make more difficult the securing of funds for legitimate railway purposes. It is probable that in no other respect were the early projectors of interurban railways so frequently led astray by their optimism as in connection with their estimates of probable future business. Unquestionably, the electric interurban has done much to develop communities but the process has in general been accompanied by such conditions as have made the results less satisfactory from a financial basis than investors had a right to anticipate, with the unfortunate result that private capital has lately looked with less favor on such investments.

## GREATEST DEVELOPMENT FROM 1898 TO 1906

The history of electric traction,\* so far as interurban railways are concerned, may be divided roughly into three parts. From 1888 to 1897 may be termed the preparatory period as during these years experiments in the application of electricity to street railways disclosed the many advantages which this form of motive power had over animal traction and the very promising, though short-lived systems of propulsion by cable. The advantages of electric power encouraged street railway

Although electric interurban railways are of great economic importance to the communities which they serve, their financial returns have not been satisfactory. The author of this article analyzes the factors which have caused failure in the past and outlines conditions under which better results may be expected in the future.

operators to extend lines into the less well settled parts of cities and eventually into suburbs. Later developments have indicated that many of these extensions were unwarranted and that they have remained until the present burdens on other and more profitable lines.

Beginning in the late nineties, for convenience let us

say 1898, many lines were projected and built, first as continuations of suburban lines and later as independent projects to connect larger centers of population with outlying villages and with cities of larger size at some distance. This movement continued, and a considerable amount of mileage was constructed up to and including 1906. The financial difficulties of 1907 brought to a close the second period which may be termed that of development, and from that time to the present a very small amount of electric interurban mileage has been projected and built.

While the financial depression beginning late in the year 1907 would have restricted the development of interurban railways, it is evident that other causes have been effective deterrents, inasmuch as the recovery in other lines of industry was accomplished within about two years. In 1912 and at the present time business conditions have been excellent for the development of new enterprises, but it appears that interurban railways have not enjoyed the prosperity of other lines of commercial activity. The explanation undoubtedly lies in the fact that many electric interurban railways have not justified the anticipation of their projectors.

## STIMULUS GIVEN BY PROGRESS IN ELECTRICAL DESIGN

One of the principal causes of the rapid growth of interurban railways in the decade preceding 1907 was the possibility of high-speed operation brought about through the invention and perfection of the transmission of high voltage current, together with the development of the rotary converter and improved transformers. The progress in the art of transmission and application of electric power was rapid and held out great promise of providing a satisfactory and economical source of power. Unquestionably the later developments have justified many of the claims which electrical men have at any time made for their apparatus, but the advantages derived from the perfection of the transmission and application of electric current were allowed to outweigh certain of the handicaps to be experienced

\*For a brief but very interesting historical sketch of transportation, from its earliest recorded forms to the modern high-speed electric interurban railway, see address by Chas. T. Henry, president Indianapolis & Cincinnati Traction Company, 1911, Proc. A. E. R. A. Page 220.



by new lines. Funds for the projection of interurbans were obtained through directing attention to the development of the art rather than to the development of traffic or the difficulties thereof.

It would be interesting and instructive to trace the growth in mileage of electric interurban railways were accurate data available for the purpose. Prior to 1912 the United States Census contained no specific figures of interurban development, but data disclosed in that year indicate that slightly more than 16,000 miles out of 41,000 operating in the United States were to be classed as interurban lines. Of this mileage nearly one-half lies in the east north central division, which contains the states of Ohio, Indiana, Illinois, Michigan and Wisconsin; Ohio leading with more than 2700 miles. The accompanying table gives the mileage reported in 1912 census, together with the rank of the several states and division.

#### THE AVAILABLE STATISTICS ANALYZED

While not conclusive it is at least important to note that of the 7800 revenue cars other than passenger cars in service in 1912, nearly 75 per cent were in service in 1907 and only 14 per cent in 1902. In a general way this locates the period of growth of interurban railways in the five years preceding 1907, although the movement continued into the two following years. The revenue car-hours operated in these years is also sig-

nificant, there having been 92 per cent as many car-hours made by express and freight cars in 1907 as in 1912, and but 16 per cent as many in 1902 as in 1912, indicating an increase of about 500 per cent in the first five years of the decade and an increase of only about 9 per cent in the last five years. In 1907 the freight revenue of electric roads was five times as great as in 1912, but from 1907 to 1912 the revenue did not double.

It is difficult to get comparable figures from the various reports of the State commissions. The Illinois Railroad & Warehouse Commission reports miles of line constructed by years since 1900. The maximum amount of construction was in 1906, and is reported as 168 miles. This is 20 per cent of the total construction of 847 miles in the years 1900 to 1914 inclusive. In the three years 1904 to 1906, inclusive, 392 miles or 47 per cent of the total for fifteen years were reported. The Public Utilities Commission of Ohio reports total miles constructed from 1908 to 1915, inclusive, as 364, of which 216, or 60 per cent, were built in 1908 and 1909.

One of the serious difficulties in a study of interurban electric railway statistics lies in the fact that it is difficult to define with accuracy and to distinguish between urban, suburban and interurban railways. A considerable portion of the mileage of certain interurban railways, particularly those in the more densely settled part of the United States, lies in political subdivisions which, while termed town or township organizations, are quite comparable to the villages and other incorporated municipal divisions of the Western States. Another difficulty is met in connection with the mileage of interurban railways lying within the corporate limits of the various municipalities served. Further, it is not always clear on what basis an electrified division of a steam railroad is to be considered. A part of the lines of the Long Island Railroad Company lying in the Borough of Queens has a traffic very similar to that of New York, Westchester & Boston and of the San Francisco-Oakland Terminal Railway. The latter is generally classed as an interurban electric railway. The Westchester is in many respects a suburban electric railway, although it serves to connect several cities of considerable size with New York. The electrified division of the Long Island Railroad is not usually considered to be an interurban railway, although the difference between it and some others which are so classified is not obvious. In the general use of the term it is probable that the classification "interurban" is associated with an electric railway system such as the Illinois Traction or the Pacific Electric Systems or those systems in Indiana and Ohio which, though having less mileage, are nevertheless typical interurban developments. A road such as the Bay State Street Railway Company is an interesting variant. It has resulted from the consolidation of a large number of small urban systems in adjacent communities.

Due to these variations in type, accurate and consistent definitions are difficult, but for the present purposes the following will be considered as essential and characteristic features of the electric interurban railway. Car mileage is made chiefly outside of city limits. The lines serve in general more than one primary center of population as distinguished from a suburban system which serves in general one primary center and one or more secondary centers of population. The terms primary center and secondary center as here used are relative and correspond roughly to the usual designations "terminal" and "subterminal." In the past it would have been of assistance in framing a definition of the interurban railway to point out that a distinction between an electric interurban and an electrified division of a steam road lay in the fact that the latter

INTERURBAN TRACKAGE  
1912 Census

Geographic Division	Miles	Rank	Per Cent of All Electric Railway Track	Rank
Total	16,366		39.9	
East North Central	7,193	1	60.9	1
Middle Atlantic	3,159	2	34.4	3
Pacific	1,825	3	43.6	2
New England	1,388	4	26.2	7
South Atlantic	856	5	28.9	5
West North Central	821	6	26.5	6
Mountain	338	7	33.6	4
West South Central	322	8	23.4	8
East South Central	164	9	12.7	9
State:				
Ohio	2,747	1	67.5	4
Indiana	1,777	2	77.2	2
New York	1,617	3	35.1	21
Pennsylvania	1,575	4	38.2	19
Illinois	1,343	5	43.0	16
California	1,095	6	42.0	17
Michigan	911	7	60.5	6
Massachusetts	796	8	26.4	28
Washington	428	9	41.3	18
Iowa	427	10	53.1	9
Wisconsin	414	11	51.4	10
Oregon	301	12	55.3	7
Maine	273	13	50.9	11
New Jersey	268	14	20.3	31
West Virginia	257	15	63.5	5
Kansas	243	16	53.8	8
Maryland	234	17	33.7	23
Texas	200	18	27.9	25
Connecticut	174	19	17.4	32
Colorado	134	20	28.6	24
Virginia	132	21	23.5	30
Kentucky	127	22	25.7	29
Oklahoma	109	23	43.1	15
New Hampshire	107	24	43.3	14
South Carolina	90	25	44.4	13
Utah	90	26	34.5	22
Missouri	83	27	8.3	39
Idaho	69	28	77.4	1
Georgia	65	29	14.8	33
North Carolina	52	30	27.4	27
Minnesota	39	31	7.0	43
Vermont	28	32	27.5	26
Tennessee	28	33	7.5	42
Nebraska	26	34	10.5	36
Arizona	17	35	37.7	20
Florida	15	36	9.1	38
Louisiana	14	37	4.7	44
Wyoming	11	38	46.0	12
Rhode Island	11	39	2.8	45
Delaware	11	40	12.0	35
Mississippi	9	41	7.8	41
Nevada	8	42	70.7	3
Montana	8	43	7.9	40
North Dakota	4	44	13.8	34
New Mexico	1	45	10.4	37



interchanged equipment with the steam roads, but this distinction is gradually disappearing.

Owing to the difficulty of definition and classification pointed out above, there are practically no regularly published statistics available, concerning the financial and operating conditions of interurban railways as distinct from other types of electric traction. Various items appear, of course, from time to time in the *ELECTRIC RAILWAY JOURNAL* and other technical publications, and in financial journals, such as the *Commercial & Financial Chronicle* and *Wall Street Journal*.

An examination of these various sources of information furnishes some interesting data concerning the number of receiverships of electric interurban railways, together with the mileage and outstanding securities involved. For the past seven years the *ELECTRIC RAILWAY JOURNAL* has published early in January of each year a statement showing the extent of receiverships of suburban and interurban railways during the preceding twelve months. The accompanying table is summarized from this source:

ELECTRIC RAILWAY RECEIVERSHIPS IN SEVEN YEARS—1909 TO 1915

Type	Length of Line		Outstanding Capital Stock		Securities Funded Debt	
	Miles	Per Cent	Amount	Per Cent	Amount	Per Cent
City lines ....	1,374	34	\$71,418,500	36	\$152,791,990	60
Suburban and Interurban Lines ....	2,631	66	127,984,700	64	100,826,875	40
Total .....	4,005	100	\$199,403,200	100	\$253,618,865	100

#### UNDUE OPTIMISM THE CAUSE OF MANY FAILURES

The financial difficulties here outlined are to a considerable extent the result of over-development and of an unwarranted optimism as to the traffic which was or would become available. A more detailed study of the causes indicates that the almost complete failure of electric railway construction, begun after the financial depression of 1907 and 1908, is due to a variety of causes in addition to those already pointed out. Failure to earn results, both from high costs and low revenue, and in the case of interurban railways, both factors are in evidence. A very important and frequent cause of financial difficulty is that fixed costs have exceeded the preliminary estimates. This situation arises, of course, in many lines of business, but it has been particularly true in the case of the interurban railways, due to the fact that in making preliminary estimates there has been a relatively small amount of information available. It is further worthy of note that there are but few industries upon which it is possible for communities to place such large burdens as have been repeatedly placed on electric railways. An interesting example of the fact that costs may frequently largely exceed estimates may be found in the case of the Philadelphia & Western, which it was proposed to construct for some 10 miles west from the western part of the city of Philadelphia from the proceeds of a bond issue of \$1,500,000, principal amount to be sold at 90 per cent of par. After construction was completed it was found that more than \$4,000,000 cash had gone into the property.

The undue optimism which underestimates cost of construction and fixed charges is also in evidence in connection with operating expenses. It has been the common experience in all lines of industry that the cost both of labor and material has increased largely during the last fifteen years. Many interurban lines proceeded with construction at a time when the plans they were adopting had not been sufficiently tested to warrant the assumption that the results could be regularly achieved. A frequent burden of expense to those in-

terurban roads which are the result of the consolidation of a number of small roads arises from the varying equipment and standards of the several lines combined. It has been found that powerhouses were not well located for the economical production of power, and that the size of the units was not economical for use in connection with the combined properties. Similarly the location of carhouses and repair shops, which may have been advantageous in connection with the property for which they were originally built, proves a handicap to operation when the properties are later consolidated.

In addition to the fact that expenses have greatly exceeded the original estimates it is of importance to note that revenues have invariably been less than estimated. This is due, in part, to a slower rate of development than had been assumed and in part to the construction of lines and operation within territory which is fundamentally deficient as a producer of traffic. The writer hopes, at some later time, to have an opportunity to present the results of a study of the general subject of estimating future business. Certain conclusions only need be pointed out at this time.

Estimates as to future population are distinctly unreliable, and comparison with the growth of towns apparently similarly situated is unwarranted. Estimates as to the probable traffic to be developed are likewise unreliable when based on a comparison of gross revenue per capita received by other lines in the territory they serve. If any one cause for the failure of electric interurbans to earn satisfactorily is to be emphasized it is this, that neither population nor revenue per capita can safely be estimated on the performance of other communities.

#### COMPETITION MET FROM STEAM RAILROADS AND AUTOMOBILES

Unexpected competition has been met with from steam roads which, with increasing density of passenger traffic, have been able to operate more frequent trains and thus attract to themselves certain passenger traffic which had been counted on for the interurban lines. In the meantime, passenger rates on steam lines were generally reduced from 3 cents to 2 cents per mile. This took away from the interurban its advantage from the lower fares, as it has not been found possible to operate at a rate much below 2 cents per passenger mile.

Within the last few years the good roads movement and the increased use of automobiles has introduced a serious type of competition. In the territory of one of the interurban companies in New England there were, early in the summer of 1916, 26,000 automobiles registered, exclusive of those in the principal city served by the company. If these 26,000 automobiles take but 10 cents a day from the interurban its revenues are affected to the extent of nearly \$1,000,000 a year. Nor is the competition for the passenger business the only serious result of the increased ownership and use of the private automobile. In certain localities express and freight service is regularly given by motor trucks and vans. These combine high speed on the road with short delays at terminals and due to the fact that they rely on others, notably the electric railway companies, to maintain the streets and highways for their use, they are able, under certain circumstances, to furnish service at a less rate than it can be rendered by the interurban. From the standpoint of a competitor, the automobile truck has distinct advantages in that it can make its charges to those cities, also receiving electric interurban service, sufficiently less to attract business, while in other communities where electric lines do not run the auto truck can charge a rate sufficiently high to offset any loss that might accrue on its competitive



business. A regulated utility does not have this opportunity. It is very likely that, within the next few years, much more attention will be given to the question of construction and maintenance of highways than has been given to it in the past. At the present time many cities and states are finding that the so-called permanent roads which they have constructed are wearing out before the bonds issued for the original construction have matured, the life of the highways having proven to be much shorter than was anticipated. Quite likely some effort will be made to place the burden of maintenance of highways more largely on motor vehicles, which are the chief destroying agency. Such a development would, of course, limit to some extent the competition experienced by electric lines from motor vehicles.

One difficulty not foreseen by the early projectors of interurban lines has been found in connection with the acquiring and operation of terminals. Many communities have been unwilling to permit the delivery or carriage of express and freight to and through the business districts over the lines of electric railways, and for this reason the development of freight and express business has been greatly retarded. The Illinois Traction System has met this difficulty in certain cases by the construction of belt lines located outside of the city limits. Such lines serve not only to avoid the restrictions imposed by the ordinance, but also provide excellent sites for the location of industries. These belt lines intersect the steam lines entering the city, and the traction company is able, by means of interchange agreements, to serve as either originating or delivering carrier for shipments handled in connection with the steam lines as well as handle traffic between points on its own line.

The increase of passenger fares on certain interurban railways during the past few years has served to make this business show smaller losses and is a recognition on the part of regulating bodies, where such have jurisdiction, that the original rates of fares of interurban roads were too low. In addition to the problem of finding satisfactory and adequate terminals for the handling of other than passenger business, freight business has been retarded in growth by rate schedules which for various reasons have proved to be unbalanced. A few interurbans have suffered a decline in revenues from a decline in business prosperity of the region served. This is particularly true in the case of certain lines in operation in the Northwestern States. Here a very marked activity in commercial lines was succeeded a few years ago by a very marked decrease, and in a number of communities by a considerable decrease in population. Roads which were built to serve these communities have, of course, suffered severely for this reason.

In 1915 the steam roads in the United States hauled a ton of freight 9 miles for every passenger carried 1 mile, and they received \$3 of freight revenue for every dollar of passenger revenue. They also hauled a freight car 6 miles for every passenger car 1 mile. This indicates that the bulk of transportation in the United States is freight transportation, and suggests that the interurban, which is fundamentally in competition with the steam roads, as a carrier must develop its freight business. In Ohio, where the interurban development is typical, the revenue from passenger fares, together with that from baggage and parlor and special cars, was \$16,000,000 in 1914, while that from express, milk and freight was only \$1,800,000. The Illinois Traction System in 1915 was receiving only about 20 per cent of its revenue from freight service. As has been suggested above, franchise restrictions account, in part,

for the apparent underdevelopment of the freight business. A further factor is the difficulty which electric lines have had in effecting interchange, joint rate through billing and switching absorption agreements with steam lines.

In recent years, however, the Interstate Commerce Commission has taken a hand, and the electric lines, backed by shippers and commercial organizations, have been able to make satisfactory arrangements for entering the freight business on the same basis as the steam roads.

Thirty years ago many of the shorter steam lines found themselves in the present situation of the electric lines. The solution of the problem for them differed somewhat, and they are now found as a part of larger systems, having been acquired after their inability to get favorable traffic agreements with their larger connections had forced them into receiverships.

#### POSSIBILITIES OF RELIEF

The place of the electric interurban in the economic scheme of the country is that of a transportation agency and not primarily that of a device for promoting growth of communities. In so far as it may be self-supporting as a transportation agency, it may serve the other purpose as well, but privately owned it must earn or go out of business. In many cases in the past it has not earned and has been forced to accept a large shrinkage in value in order that it might continue to operate. Even with these measures, many roads are still in doubtful condition, and will be until they receive some measure of relief. The form that this relief may take must in general be that of increased fares for passenger traffic and of a better adjusted scheme of rates for freight business so arranged as to secure greater diversity of traffic and adequate terminal facilities for freight carrying roads. This will tend to increase the density of traffic and to avoid the serious seasonal variations now met with.

### Montreal & Southern Counties Railway

St. Cesaire-Granby Extension Forms a New Milestone in Canadian High-Speed Electric Railway Development

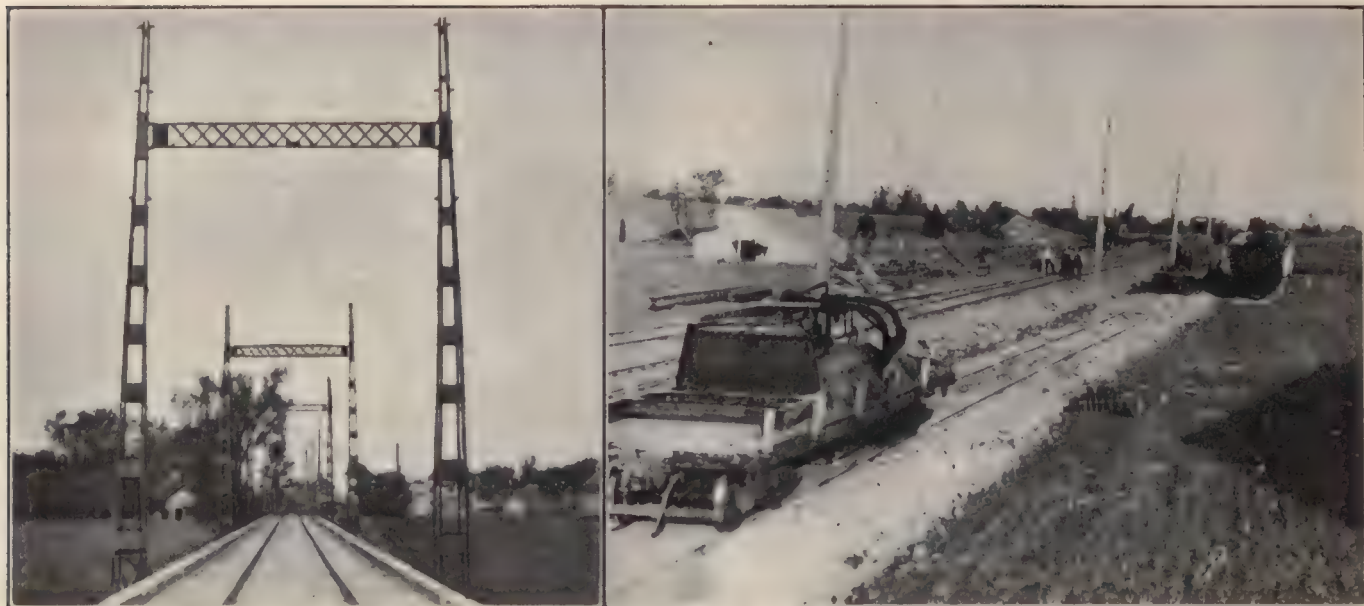
**A**NOTHER rung in the ladder of development undertaken by the Montreal & Southern Counties Railway has just been added by the placing in operation of the new 16½-mile extension from St. Cesaire to Granby. This new line, which marks a milestone in high-speed electric railway development in Canada, was placed in operation on April 30, 1916.

The Montreal & Southern Counties Railway is a suburban and interurban railway, connecting the south shore of the St. Lawrence River with Montreal via the Victoria Jubilee Bridge. The interurban arm of the development stretches in an easterly direction for a distance of 47.5 miles through the counties of Chambly, Rouville and Shefford, the present terminus being Granby. A description of the older portion of the line together with a map of the region was published in the *ELECTRIC RAILWAY JOURNAL* for March 28, 1914, page 702.

From a limited service inaugurated in 1909 between Montreal and St. Lambert, a distance of 3½ miles, extension after extension has been added until at the present time a majority of the municipalities of the south shore have been brought into such close communication with Montreal through frequent service as to make commuting a pleasure.

Construction work on the new extension was begun





MONTREAL & SOUTHERN COUNTIES RAILWAY—OVERHEAD CONSTRUCTION OF YAMASKA BRIDGE; ALSO VIEW SHOWING METHODS OF TRACK CONSTRUCTION

in October, 1913, when a contract was let for the construction of the concrete piers for the steel bridge across the Yamaska River at St. Cesaire. This bridge, which is of the deck girder type, is 240 ft. long and is supported on four piers spaced 80 ft., center to center. The steel work was supplied and erected by the Hamilton Bridge Company of Hamilton, Ont.

In the spring of 1914 a contract was let for the construction of the roadway. Work was commenced May 25, 1914, and sufficient force was employed to complete the work and place the road in operation by Oct. 15 of the same year. On Aug. 5, however, all construction work was suspended due to England's declaration of war, and it was not resumed again until May 19, 1915, from which date the work was carried on uninterruptedly until its completion Dec. 12, 1915.

#### LINE CONSTRUCTION

The type of construction used on this section is similar to that employed on the previously electrified extensions. The bonding consists of No. 0000 concealed type triplex bonds with  $\frac{7}{8}$ -in. terminals for compressing into the web of the rail. The overhead construction is of the standard catenary type with  $\frac{7}{16}$ -in. Siemens-Martin grade stranded galvanized steel messenger cable, from which, at intervals of 15 ft., is supported a No. 0000 American standard grooved hard-drawn trolley wire. The hangers are of the floating type, especially designed to absorb shocks, and consists of a three-bolt malleable-iron Detroit ear, to which is riveted a  $\frac{3}{4}$ -in. wide by  $\frac{1}{8}$ -in. thick strap-iron hanger.

Within the town of Granby the construction is cross span with 28-ft. steel poles set in concrete. The remainder of the line is constructed with 40-ft. cedar poles 7 in. in diameter at the top. On tangent track the poles are set 150 ft. apart, while on curves the spacing is either 75 ft., 90 ft. or 105 ft., according to the degree of curve. The minimum clearance between poles and rail is 6 ft. on tangent track and 6 ft. 6 in. on curves. Bracket type construction was used wherever possible. A 10-ft., T-iron bracket on which is mounted a malleable iron pin and porcelain insulator carries the messenger wire. The messenger wire is allowed to ride free in the recess in the insulator, thus permitting free adjustment of line between anchors, which are located a half

mile apart. Throughout the yards and on a number of the curves cross-span construction is used.

Supplementing the trolley wire throughout the entire distance is a 816,000 circ. mil aluminum feeder, with taps every quarter mile. The feeder is carried on glass insulators with oak pins, which in turn are carried in  $3\frac{1}{2}$ -in. x  $4\frac{1}{2}$ -in. x 4-ft. B. C. fir cross-arms. On all curves double cross-arms are used, and the wooden pins are replaced by malleable iron ones. The feeder taps consist of No. 00 stranded weatherproof wire, a four-bolt aluminum clamp being used to attach it to the feeder. A Garton-Daniels lightning arrester is installed at each tap.

On the top of the same poles which support the trolley feeder and telephone is carried the 25,000-volt, three-phase transmission line. The insulators are supported on steel pins with porcelain bases. No. 4 B & S gage copper wire is used for transmission and No. 8 B. W. G. galvanized-iron wire is used as ground wire. The ground wire is grounded every quarter mile.

The telephone dispatching system already in use was extended from St. Cesaire to Granby. The line wires are No. 10 B & S gage hard-drawn copper, and are carried on side blocks. This line is transposed every third pole in order to counteract the effect of induction. The instruments are of the Northern Electric Company selector type.

#### BUILDINGS

A substation equipped with three 185-kva. step-down transformers, a 400-kw. synchronous motor-generator set, and the necessary control apparatus for converting the 25,000-volt, 63-cycle alternating current to 600-volt direct current, was constructed just outside of Granby.

At Abbotsford the company erected a station building to provide accommodations for the passenger, freight and express traffic. A three-story brick block was purchased at Granby, the main floor and basement of which is used for station purposes.

The work of electrification was carried on by the company itself under the direction of G. J. Meyer, chief engineer and general superintendent. Other company officers are: E. J. Chamberlain, president; Frank Scott, vice-president; J. A. Yates, secretary, and W. B. Powell, general manager.



# The Fundamentals of Power Saving

The Author Explains the "Why" of Power Saving in Simple Language, Shows that Power-Saving Methods Save Brakeshoes, Reduce Load Peaks and Increase Safety, and Formulates Rules for Power Saving by Motormen and Conductors

By WILLIAM ARTHUR

New Haven, Conn.

**A**T FIRST blush one would expect to find that a process so common as the starting, running and stopping of a train or trolley car would long ago have been reduced to an exact science, and that the possibility of saving power by attention to the engineer's or motorman's method of notching up and braking would be quite limited. Yet the reverse is true. If left to themselves few motormen will handle a trolley car in an efficient and economical manner. They do not understand the basic principles—"the reasons why"—of economical car operation, and usually no incentive is held out to cause them to change their present wasteful methods.

In what follows, effort will be made to state in simple terms the fundamental principles governing efficient trolley car operation; it being understood that in general most of what is said applies equally well to local services on either steam or electric railroads—in fact, to any service requiring frequent starts and stops. In a technical sense, much has already been written on this subject. However, many of those most interested in power-saving methods—inspectors, foremen, instructors, chief motormen and others—have usually little time or opportunity wherein to study the more abstruse presentations

of the subject, and the present article is written with these men in mind.

## FUNDAMENTAL PURPOSE OF CAR OPERATION

Right at the beginning it is well to define why trolley cars are operated at all. Their fundamental purpose is to transport the public safely, comfortably, conveniently and as swiftly as the local needs demand. In doing this, car equipment must not be abused. No efforts at saving energy will be countenanced which prejudice any of these primary considerations. As we shall see, these requirements do not necessarily conflict with economical operation, but rather, in most respects, are its natural accompaniment.

## HOW CAN POWER BE SAVED?

Let us ask ourselves the following question: Suppose it to be assumed that a motorman is required to operate a car between two points a quarter-mile apart. How can he make the trip with the least expenditure of energy? The answer depends entirely upon the time allowed.

*Case A.*—Suppose that there is no time limit. Obvi-

## Rules Relating to Methods of Power Saving

A motorman can save power by attention to the following:

1. Be alert, and whenever possible have the brakes off, ready to start the moment you get the bell.
2. Notch up at as fast a rate as a proper regard for safety, for the comfort of the passengers, and for the care of equipment, will permit. Endeavor to avoid a jerky start; gather speed swiftly, yet smoothly. If likely to make a very short run, notch up to full series quickly; wait for a few seconds before moving to the parallel notches. This both saves energy and reduces the draft of power required from the power station. Move to the parallel position only as often as it is necessary to maintain the schedule.
3. Shut off power as soon as possible, but not so soon as to cause you to lose time.
4. Coast for as long a time as possible.
5. Apply the brakes at as late a time and at as low a car speed as is possible, having proper regard to safety and to the need for stopping at the proper place.
6. When braking, do so at as high a rate as is possible, having regard for the comfort of the passengers. Slow down the car without jerks. Whenever possible, make one application do the work. Ease the brakes a little just before the final stop. This will avoid a jerk.
7. Avoid unnecessary stops; for instance, when coming up behind a team,

if there is a chance you may be stopped, at once shut off power and coast up to the obstruction, sounding your bell loudly as you approach. The chances are that very often you will not be forced to stop at all, and you will have saved power. To do this requires that you keep a good lookout for possible obstructions.

8. In stopping to pick up passengers, stop at the right place; otherwise, the passengers will have to walk some distance, and time will be wasted. Remember that time wasted in the end means energy wasted.

9. Whenever necessary, do your part to help the passengers in and out of the car. This will shorten the stop and so save both time and energy.

10. Report promptly any car which is

in any way defective. Report a car which seems to start too slowly or which does not run freely. Report defective or weak brakes. Report dragging brakes. Such reports will make for greater safety and better economy in operation.

11. Report any sections in the run or places at which you regularly meet obstructions, or have to run slowly, due to low voltage or other reasons.

12. Avoid arriving at your destination or meeting point ahead of schedule time. The only way you can have done this was to have used more power than was necessary.

13. Avoid delays and lost time in every way, having due regard to other considerations. Remember at all times that time saved is, in the end, energy saved, and that time wasted is energy wasted.

A conductor can save power by attention to the following:

1. Be alert. Remember that the total energy used by a car depends almost as much upon how you do your part as it does on how the motorman does what is expected of him.

2. Avoid delays of all kinds. Remember that time wasted at any point in the run is, in the end, energy wasted.

3. Make the stops as short as possible, having regard to the safety and convenience of the public. Economy must begin only when safety has been assured, but it should begin then. Where necessary, assist the passengers

in and out of the car. This is good policy, and will save both time and power.

4. Give the motorman a clear signal just as soon as you are ready to have him start.

5. As soon as the car starts, call out in a clear voice the name of the next street or stopping point, so that as early as possible passengers may signify their desire to stop. Your bell in time will often prevent the motorman from throwing his controller handle over to the parallel position unnecessarily, and so you will have helped to save energy.



ously, then, the most economical operation would be for him to start the car, and then when it has gained speed shut off power and coast until the car stops, judging the speed at which power is shut off, so that the stored energy will just carry the car the required distance. By this plan the total energy input to the motors, except that wasted in resistance, is usefully utilized for propulsion, *i.e.*, in overcoming resistance to car motion. If, however, power is held on too long the speed will rise higher than is necessary; the run will be made in shorter time than before, and the car will over-run the stopping point unless the brakes are applied, *i.e.*, unless the extra energy put into the car is absorbed at the brakeshoes.

*Case B.*—If the motorman be told to make the run in ten seconds time less than before, he obviously can only do so, assuming the same acceleration rate, by keeping power on longer and applying his brakes to make the stop. In other words, time is gained at the expense of energy consumption.

*Case C.*—If, however, he again repeats the run and accelerates sufficiently fast, he can shut off power earlier than before, and then coast to a stop, making the trip in the same decreased time as before, but without using the brakes. In other words, the required ten seconds can be gained by correspondingly quicker acceleration and without wasting energy at the brakeshoes. If in the cases A and B the motorman had already accelerated the car at the highest practicable rate, then the saving in time (ten seconds) in case C could have been made only by keeping power on longer and using the brakes.

#### EFFECT OF LOSING TIME AT STOPS

If in maintaining a certain schedule the motorman loses time—say, in responding to the bell or in notching up or in braking at too slow a rate—he wastes energy to the same degree, because the actual running time has been decreased. If the conductor loses time in giving the signal or in other ways, he causes energy to be wasted proportionately. In this matter we are apt to consider the motorman too much and the conductor too little. Economical car operation depends upon the team work and joint efficiency of both.

From what has been said, it will be clear, after a little thought, that for any given schedule, other conditions remaining the same, the following relations exist:

(A) As the acceleration rate increases, the time power needs to remain on decreases; the coasting time increases, the braking time decreases, the maximum speed is lowered (for short runs), and the energy consumption is lowered.

(B) An increase in braking rate will produce the same general result as an increase in acceleration rate.

(C) The effect of a change in the length of stop is exactly similar to that caused by corresponding changes in either the acceleration rate or the braking rate.

#### MONEY SAVING DUE TO POWER SAVING

The difference between the least and most efficient possible car crews, in practice, is usually found to be represented by almost 50 per cent saving in energy consumption for the same service. This has been repeatedly demonstrated by careful tests and affirmed by many independent observers.

Suppose that the inefficient crew uses 3 kw.-hr. per car-mile and the efficient crew only 1.5 kw.-hr. for same service, *i.e.*, 50 per cent reduction as above; then assuming an over-all efficiency from trolley to busbar of 80 per cent, and with power at 1 cent per kw.-hr., poor operation will waste approximately \$4 per car per day. This is a considerable percentage of the crew wages. The average saving to be made on any ordinary city system is, of course, much less than this, for all car

crews are never so poor as the poorest, nor can they all be trained to reach the high point of efficiency attained by the best operators. It has, however, been repeatedly demonstrated that large savings can be made, and by proper means, steadily maintained.

Right here it might be said that up to a certain point passengers do not experience discomfort from high acceleration and braking rates. Discomfort arises more from jerky changes in the rate. Uniform acceleration or braking, even at rates as high as 2 m.p.h.p.s. or more is not uncomfortable, whereas sharp variations, say from 0.5 to 1.5 m.p.h.p.s. and back again, are quite uncomfortable. For years the writer traveled daily on a railway where acceleration rates as high as 2.5 and even 3 m.p.h.p.s. were common practice, and the public experienced no appreciable discomfort. These rates are unusual, however, and in any case trolley cars are rarely equipped with sufficiently powerful motors to make such rates possible, nor with ordinary city schedules are such high rates necessary. Economical operation can be realized by using reasonably high acceleration and braking rates. Nothing more is necessary.

The question now arises: How can we insure that the motorman and conductor operate the car so as to take advantage of these opportunities for saving energy; and, at the same time, how can we compare the relative efficiency and team work of two or more car crews operating similar services from day to day?

#### INSTRUCTION NECESSARY

The first thing to do is to give them suitable instruction, explaining in simple language the principles involved. This can be done through personal instruction by some properly qualified inspector, or by a series of lectures, at which, by the aid of a blackboard, 100 or more men can be taught at one time, or by the issuance of a small booklet of instructions on "Saving Power" distributed to each man concerned. Any or all of these methods would help to teach the men "how." Instruction, however, of itself is not enough. Experience has invariably shown that the gains which follow a power-saving campaign based on instruction only are temporary in character and disappear gradually when the first enthusiasm has passed. To make the gains permanent and to stimulate and retain the men's interest, it is necessary to have some means of comparing, on a fair and indisputable basis, their efficiency from day to day, and publishing at weekly or other intervals an efficiency record listing the relative standing of each man. How can this be done?

#### DEVICES FOR CHECKING MOTORMAN EFFICIENCY

It is obvious that through the use of suitable recording apparatus we could compare the men's relative all-day efficiencies, having as a basis any one of the three elements: power-on time, coasting time and braking time. Three types of apparatus are already available for this purpose, embodying each of the three principles above outlined, respectively.

In comparing men by the first method it is convenient to do this directly, and, by the use of a wattmeter or an ampere-hour meter, measure the actual energy input rather than the time element.

The second method is that utilized in the coasting time recorder.

The third method, recently developed by the writer, in one form simply records braking time. Since the energy wasted is chiefly that thrown away at the brakeshoes, it follows that by recording braking time the desired efficiency comparison is simply and easily made.

Each method possesses certain advantages and disadvantages, which, however, need not be here discussed.



The point may be emphasized, however, that no matter how the efficiency check is made—so long as it is made upon some fair and effective basis—the net effect upon motorman and conductor is exactly the same. Recording devices of themselves do not save energy, but in each case they force the motorman to pursue the correct methods of operation at each part of the cycle; otherwise he gets a bad record.

#### SAVINGS OTHER THAN IN POWER

It should be remembered that the saving in energy is only one of the points of advantage which result from a power-saving campaign. The other points may be briefly summarized:

1. The saving in brakeshoes is considerable, and from experience at many places appears to average about 33 per cent.

2. On large systems peak loads are reduced and power station, transmission line, substation and feeder-copper capacity are increased in proportion to the power saving. Extensions to existing plant may therefore be postponed. Voltage conditions are improved.

3. The average load on car motors is usually reduced. This is in contradiction to the first impression one is apt to have, namely: that quicker acceleration will necessarily increase the load on the motors. Analysis shows that although the momentary load on the motors is increased, the average motor heating is decreased. This is equivalent to a gain in motor capacity to the same extent, or, put another way, is equivalent to adding new cars to those already operated. The full advantage of this, however, obviously can only be realized on routes requiring many cars to maintain the headway.

With the increase in motor capacity referred to above, the schedules may often be "jacked up" proportionately without exceeding the normal safe capacity of the motors. This leads naturally to the next consideration, which in certain situations may be of more importance than the consideration of the amount of power which is saved.

4. As an average figure, approximately 55 per cent of the total expense of operating a trolley system consists of items which are affected by a change in schedule speed. The platform expense alone is usually about 30 per cent of the total operating expense. This expense and the number of cars required to maintain a given service are, of course, reduced proportionately to the increase in schedule speed.

In connection with this there is another point: In situations where the public demand is for quicker service, necessitating higher schedules, if the men have previously been operating at high efficiency, such new schedules can only be given at the expense of higher energy consumption per car-mile, but having once, by the use of efficiency recorders, forced the men at all times to operate in a manner best calculated to save power, we have at the same time automatically trained them to get the best that can be gotten out of any trolley car, or conditions as a whole. The result is that if it becomes necessary to raise schedule speeds, we can do so simply by shortening the coasting period and correspondingly increasing the braking period, *i.e.*, having once by the use of a recording device taken the "slack" out of a system we can utilize this slack either to save power or to raise schedules—whichever may be of greater importance in the particular case. In any given case the most economical schedule speed will, of course, be that at which the sum of power expense and platform (and other speed-affected items of) expense is a minimum. Usually, however, the problem is simply that of saving power; and, as we have seen, the economies which are

to be made in this direction alone are distinctly worth while.

5. The effect of correct operation upon safety must not be overlooked. As we have seen, the most efficient motorman is the one who on the whole is able to make his schedule with the lowest maximum speed, *i.e.*, by efficient manipulation he would each time find it unnecessary to reach the high speeds demanded by the inefficient operation of a poor motorman. This lower maximum speed makes for greater safety.

In addition, the efficient motorman, running as he does for a greater percentage of his time with power off, on the average has his car under better control. This again makes for greater safety. On the other hand, if effort is made to shorten the stop too much the danger to passengers increases. Safety first and always should be the slogan.

With the foregoing principles clearly in mind, a set of rules to form the basis of instruction to motormen and conductors on trolley cars has been tentatively drafted. They will, of course, need modification to suit local conditions. It is to be noted, however, that in every instance the element of time enters into the rule. This is striking evidence of the fundamental principle herein developed, that in the end power saving resolves itself into time saving, and time saving into power saving.

### Report of New York Bureau of Franchises

The report of the Bureau of Franchises of the Board of Estimate and Apportionment of New York City for 1915 contains schedules showing the applications presented to the board during the year and the action thereon or the present status of each case. The question of additional motor-bus operation in Manhattan, which has not yet been settled, is reviewed in detail. Owing to the financial depression during the latter part of 1914 and early in 1915, applications for franchises were fewer than before. Only four franchises were granted, one being a grant to the Long Island Railroad in exchange for rapid transit easements.

The bureau has included in its report a résumé of its work since its organization in 1905, accompanied by tables and charts showing all matters passed upon during this period. As the type of street railway cars has undergone a decided change in the last few years, photographs are presented of the various styles used by the companies in the different boroughs.

Between 1905 and 1915, 172 applications for franchises were presented to the board, of which seventy-eight were granted, sixty-three withdrawn, filed or denied, and thirty-one are still pending. The greater number of the franchises granted were for surface electric railways, forty-one grants of this character having been made mainly for short extensions to existing systems. For these forty-one grants, the total minimum compensation required for the franchise contracts was \$1,642,351. This total is composed of \$87,500 in initial payments, \$50 for past use of the streets and \$1,554,841 for minimum annual payments. The annual payments are in all cases based upon a percentage of the gross receipts with fixed minima, but the actual payments usually exceed these limits. The total number of franchise years (original term) covered by the grants is 630.16, giving an average of 15.76 years per grant and a minimum revenue of \$98,655 per year of average term. The total number of franchise years thus far expired amounts to 164.42, with an average expired term of 4.11 years, showing an average actual return on the annual payments of \$122,661 per year of expired grant.





LONDON POSTERS—MAP OF THEATER DISTRICT

## London Underground Posters

New Line of Attractive Display Sheets by English Railway Corporation

THE London Underground Electric Railways Company, Ltd., has always made a specialty of issuing very attractive traffic posters, and for this work has employed some of the most prominent artists in the United Kingdom. Views of some of those issued have appeared in previous numbers of this paper, and samples of four of the most recent are published herewith. Unfortunately, in the reproduction and reduction, a great deal of the detail is lost as well as is all of the coloring, which makes these posters most attractive. The view which suffers most, perhaps, in this reduction is the one representing the theater district of London, and shown by the single cut. The original poster is 40 in. x 50 in., and it is drawn in the old style and colored brilliantly. The border is made up of a series of panels giving the names and locations of the different theaters in London.

Of the three posters grouped together, the first has a gilt border and the lettering has an emblazoned initial and is printed in various colors. The middle poster is in red and black, and the right-hand poster is in the early English or Dutch style. The originals of these posters are 25 in. x 40 in. in size.

## Western Red Cedar Association Issues Standard Treatment Specifications

UNTIL recently different pole dealers have had different specifications for the application of preservatives. Railways have bought on these dissimilar specifications and also in accordance with their own specifications. Now the Western Red Cedar Association, after several months' investigation and study, has issued a standard set of specifications which all members will recommend for the butt treatment of red cedar poles by the open tank process. Three treatments are defined.

TREATMENT "A"—provides for a continuous submersion in hot carbolineum for a minimum duration of fifteen minutes.

TREATMENT "AA"—provides for a continuous submersion in hot creosote for a minimum duration of fifteen minutes.

TREATMENT "B"—provides for a continuous submersion in alternately hot and cold creosote for a minimum duration of six hours.

### TREATMENT "A"—Carbolineum as Preservative

Poles shall be seasoned at least four seasoning months before treatment. (See seasoning calendar appended.) All fibrous inner bark and foreign substances must be thoroughly removed from that portion of the pole between the points one and one-half feet above, and one and one-half feet below the ground line.

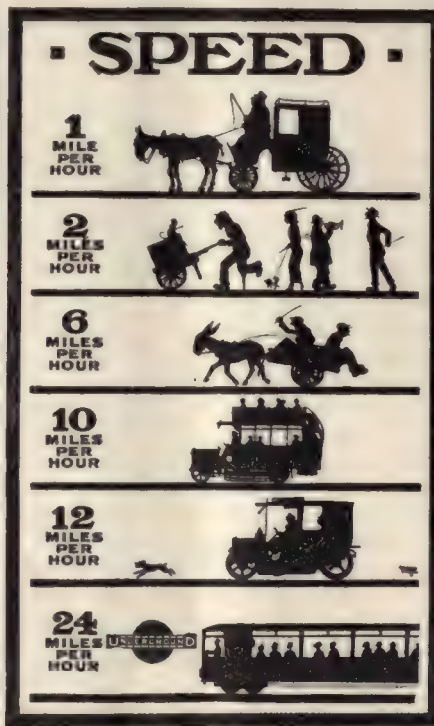
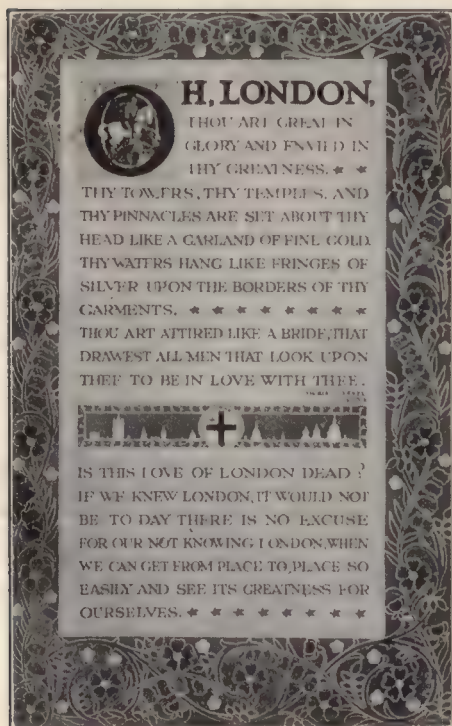
The poles shall then be placed in an upright tank with the butts fully and continuously submerged in the preservative, to the height as specified, for not less than fifteen minutes when the atmospheric temperature is 70 deg. Fahr. or higher, and a proportionately longer time when the temperature is below that point; that is, during the colder weather the time of immersion must be sufficiently longer to result in the wood becoming as thoroughly heated as it would be under a fifteen minute treatment when the atmospheric temperature is 70 deg. Fahr. or higher.

The preservative is to be that known as "Carbolineum," which must conform to the specifications shown on page 401.

The preservative shall be heated to a temperature of 215 deg. Fahr. at least once every four hours of treatment, and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.

### TREATMENT "AA"—Creosote as Preservative

Treatment "AA" is the same as Treatment "A" except that "Creosote," conforming to specifications later given, shall be used.



LONDON POSTERS—THREE ATTRACTIVE POSTERS



### TREATMENT "B"—Creosote as Preservative

The condition and preparation of poles for Treatment "B" is the same as for "A" and "AA."

The poles shall be placed in upright tanks with the butts fully and continuously submerged in the preservative, to the height specified. The duration of treatment shall be divided between a hot and a cold bath. The poles shall remain in the hot bath for four continuous hours, after which they shall be transferred to the cold bath, in which they shall remain for two hours. (See note.)

The preservative is to be that known as "Creosote," which must conform to the specifications shown herewith.

The preservative constituting the hot bath shall be heated to a temperature of 212 deg. Fahr. at least once every four hours and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.

The temperature of the preservative constituting the cold bath shall not exceed 112 deg. Fahr. at the conclusion of the treatment.

Note: The intent of treatment "B" is to give poles as near a full sap penetration as possible. Experience has shown that, due to the variance in the density of the sap wood, some poles will not take a penetration as readily as others, but at least 75 per cent of the poles shall have an average penetration of one-half the sap wood. If necessary the duration of treatment shall be extended to accomplish this result.

### SEASONING CALENDAR

Poles that has been properly piled for seasoning for a period of four seasoning months, shall be considered seasoned. In arriving at a seasoning month, the calendar months shall be rated as follows:

December, January or February equals one-eighth seasoning month.  
March equals one-fourth seasoning month.  
April equals one-half seasoning month.  
May equals three-fourths seasoning month.  
June, July, August or September equals one seasoning month.  
October equals three-fourths seasoning month.  
November equals three-eighths seasoning month.

### REQUIRED ANALYSIS OF "CARBOLINEUM"

The carbolineum shall consist of the higher boiling fractions of pure coal tar and must not contain any admixture of any other tar oil or residue obtained from petroleum or any other source.

The specific gravity of the oil compared with water at 15.5 deg. C. shall not exceed 1.135 nor be less than 1.09 at 38 deg. C.

## Open-Air Car Proves Popular in Vancouver

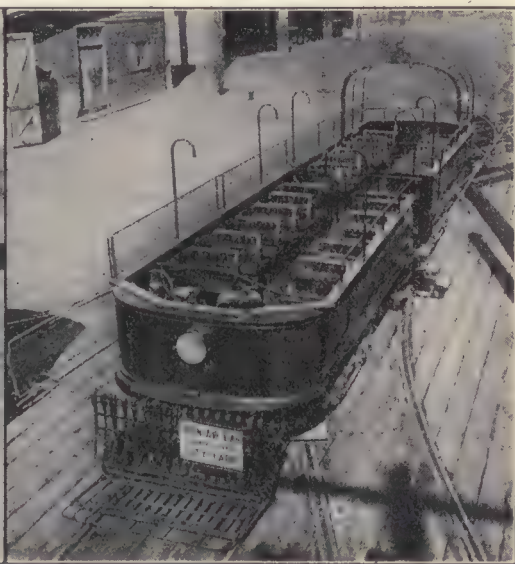
British Columbia Electric Railway Makes Good Use of Superseded Equipment

THE accompanying illustrations show an "open air" car recently put into service on the Vancouver city lines for summer travel. It is operated at regular fare and on regular runs, and has already become quite popular with the public, particularly during the evenings when there is heavy travel to the beaches and other open air resorts.

The car was originally a single-end prepayment car, with a seating capacity of forty, but it had been retired from service as it was not equipped with gates and other safety appliances required by the provincial government.

#### PARTICULARS OF VANCOUVER OPEN-AIR CAR

Length over bump-ers .....	41 ft. 7 3/4 in.	Weight, per seat.....	641 lb.
Width over rails... ..	8 ft. 3 1/2 in.	Trucks—Brill No. 27-G-1.	
Distance center to center of bolsters..	22 ft. 2 in.	Wheels—33-in. chilled iron.	
Height over trolley base .....	12 ft. 6 in.	Motors—Four GE-67.	
Step heights, 15 1/2 in., 9 1/2 in., 9 1/2 in., 10 1/2 in.		Air brakes—Westinghouse.	
Seating capacity.....	54	Fender—Watson automatic.	
Weight, body and equipment .....	12,500 lb.	Trolley base—Sterling.	
Weight, trucks and motors .....	22,100 lb.	Trolley retriever—Earl.	
		Headlights—B.C.E. Ry.	
			34,600 lb.



SINGLE-END PREPAYMENT CAR AS REMODELLED FOR OPEN AIR, CENTER-ENTRANCE OPERATION IN VANCOUVER, B. C.

The flashing point shall not, in general, be below 140 deg. C.  
The burning point shall not, in general, be below 170 deg. C.  
The amount of distillate coming over at 300 deg. C. shall not exceed 15 per cent, of which not to exceed 2 per cent shall distill below 235 deg. C.

The tar acid in the distillate coming over below 300 deg. C. shall not exceed 2 per cent by volume of entire sample.

A sulphonation test of the fraction between 300 deg. C. and 360 deg. C. should yield in residue not more than one-tenth of 1 per cent by volume of entire sample.

The percentage of residue insoluble in benzol shall not exceed 0.25 of 1 per cent by weight.

### REQUIRED ANALYSIS OF CREOSOTE

The creosote shall be a coal tar distillate obtained entirely from coal-gas or coke-oven tar and must not contain any admixture of any other tar, oil or residue obtained from petroleum or any other source, including coal-gas tar or coke-oven tar. The oil must be completely liquid at 38 deg. C. and shall be free from suspended matter.

The specific gravity of the oil shall not be more than 1.08 or less than 1.03 at 38 deg. C.

The oil shall not contain more than 3 per cent of water. Up to 200 deg. C. the water-free oil shall render no distillate.

Up to 210 deg. C. the distillate shall not exceed 5 per cent. Up to 235 deg. C. the distillate shall not exceed 25 per cent.

At 355 deg. C. the residue if it exceeds 5 per cent in quantity shall be soft.

The tar acids in the distillate coming over below 300 deg. C. shall not exceed 8 per cent by volume of the entire sample.

The present alterations included the removal of all the body structure above the sash rails, and of the end partitions. The step openings at both ends were closed and a new entrance and exit was made near the center. Three steps were arranged to swing under the car, controlled simultaneously with the gates by levers. Wood gates with clear glass panels were installed.

The trolley base was mounted on a 7-in. steel channel arch, to the rear of which was placed a guard made of 1-in. pipe with heavy wire netting over it. The seats were rearranged on 29-in. centers, and a circular one was built against the rear dash, giving a seating capacity of fifty-four.

Guard rails were placed along the open side and the standard wire guard panels, 18 in. high, along the devil-strip side. Eight 16-cp. lamps were mounted on standards along the sides, and for signaling from conductor to motorman a push-button and Faraday buzzer, the latter mounted on the front dash, were provided.



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

## ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

**A List Is Published of Manufacturing Members Who Have Been Appointed to the Convention Transportation Committee—The Manila Company Section Meeting in July Was Enlivened by Several Interesting Features**

### Manufacturers Appointed on Transportation Committee

The regular transportation committee of the American Association has been augmented by the addition of the manufacturers listed below. While acceptances have at this date not been received from all of the appointees it is hoped that all those invited will consent to serve.

#### *New England:*

Warren L. Boyer, president Bemis Car Truck Company, Springfield, Mass.  
Arthur Hale, sales agent Griffin Wheel Company, Boston, Mass.  
J. E. Johnson, purchasing agent Laconia Car Company, Boston, Mass.  
F. B. Kennedy, vice-president New Haven Trolley Supply Company, New Haven, Conn.  
R. F. Gammons, vice-president United States Electric Signal Company, West Newton, Mass.

#### *New York State (exclusive of New York City):*

W. K. Archbold, president Archbold-Brady Company, Syracuse, N. Y.  
H. M. Sperry, Publication Manager, General Railway Signal Company, Rochester, N. Y.  
Frank H. Gale, advertising manager General Electric Company, Schenectady, N. Y.  
F. D. Miller, president National Brake Company, Inc., Buffalo, N. Y.  
John Taylor, president Taylor Electric Truck Company, Troy, N. Y.

#### *New York City:*

Bertram Berry, Heywood Brothers & Wakefield Company.  
William Wampler, vice-president and general manager The Ellicon Company.  
George P. Smith, secretary-treasurer, Smith-Ward Brake Company.  
William A. Lake, The Pantasote Company.  
Edward L. Leeds, general sales manager Niles-Bement-Pond Company.  
W. R. Kerschner, president W. R. Kerschner Company, Inc.

#### *New Jersey, Pennsylvania, Delaware and Maryland:*

J. H. Horn, National Lock Washer Company, Newark, N. J.  
J. C. McQuiston, manager publicity department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.  
Ralph Moore, General Electric Company, Philadelphia, Pa.  
M. Alpern, American Engineering Company, Philadelphia, Pa.  
S. M. Wilson, The J. G. Brill Company, Philadelphia, Pa.  
F. A. Estep, president R. D. Nuttall Company, Pittsburgh, Pa.

#### *North and South Carolina, Georgia and Florida:*

F. L. Markham, The J. G. Brill Company, Atlanta, Ga.  
A. H. Sisson, Southern Car Company, High Point, N. C.

#### *Tennessee, Mississippi and Alabama:*

Frank Steffner, Chattanooga Armature Works, Chattanooga, Tenn.

#### *Indiana, Ohio and Michigan:*

Edwin Besuden, general sales manager The Jewett Car Company, Newark, Ohio.  
W. I. Ohmer, Dayton Fare Recorder Company, Dayton, Ohio.  
James H. Drew, president Drew Electric & Manufacturing Company, Indianapolis, Ind.  
F. N. Root, manager Root Spring Scraper Company, Kalamazoo, Mich.  
Elmer J. Smith, vice-president and general manager Peter Smith Heater Company, Detroit, Mich.  
F. H. Williams, manager public utilities department, The White Company, Cleveland, Ohio.

#### *Illinois and Wisconsin:*

W. S. Hammond, Jr., vice-president Consolidated Car Heating Company, Chicago, Ill.  
Frank Johnson, Ohio Brass Company, Chicago, Ill.  
L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL, Chicago, Ill.  
H. J. Kenfield, president Kenfield-Davis Publishing Company, Chicago, Ill.  
S. W. Midgley, general sales manager Acme Supply Company, Chicago, Ill.

#### *Missouri, Kansas and Nebraska:*

Edwin B. Meissner, vice-president St. Louis Car Company, St. Louis, Mo.  
D. A. J. Sullivan, Galena Signal Oil Co., Kansas City, Mo.

### Joint Meeting of the Manila Company Sections

A joint meeting of the railway and electric light company sections of the Manila Electric Railroad & Light Company was held July 11. The feature of the meeting was the announcement that D. H. Blaisdell, chief engineer of the power plant department of the company, had won the Doherty gold medal given for the best N.E.L.A. company section paper during the year. The paper in question was presented by Mr. Blaisdell at the September meeting of the Manila Section, and some twenty-five papers were submitted in the competition. Mr. Blaisdell was not in attendance at the meeting of July 11, being on a six months' vacation in the United States, but the correspondence between the secretary of the association and Vice-President Duffy relating to the award were read. Later Mr. Duffy spoke congratulating the section that it had won this medal, and saying that with the winning of the 1915 American Electric Railway Association company section medal by J. N. Bury, assistant superintendent of transportation, for his paper entitled "Courtesy," the Manila Company Section has the distinction of having one company section medal in both associations during the first two years of its existence. The speaker added that he believed that this honor was held by only one other company, namely, the Milwaukee company.

Other interesting features of the evening were an address on the advantages of company section work by the manager of the Eastern Extension Telegraph Company, and also the reading of some correspondence on the value of company sections, conducted between W. A. Smith, chairman of the Manila Company Section, N.E.L.A., and the chairman of the Brooklyn Company Section, N.E.L.A. The latter had written to the chairman of the Manila section for an outline of his views as to how company sections could be made more valuable and beneficial to employees and the member companies. It also asked for information about the Manila section. In reply, Mr. Smith described the character of the meetings in Manila, which he said were attended by an average of forty members, or sixty per cent of the total membership. In conclusion he said that to make the meetings attractive "members should be impressed with the value and importance to them of company section work, and of the opportunity it affords them to equip themselves for higher responsibilities and duties and thus advance themselves in position and salary, to the mutual benefit of themselves and the company."

A plan for caring for right-of-way that promises to be popular with farmers along the line has been adopted by the Kansas City, Kaw Valley & Western Railway. The company is leasing back to farmers, at nominal rental, the right-of-way adjoining their land under condition that they crop it. There are no restrictions as to the crops to be planted, except that the company expresses preference for forage, and this is what most of the farmers who have rented ground will plant. Alfalfa so far has proved the most frequent crop designated.



## COMMUNICATIONS

### Unit for Comparing Track Upkeep Costs

UNION TRACTION COMPANY OF INDIANA  
ANDERSON, IND., Aug. 25, 1916.

To the Editor:

I have read the editorials in your issues of Aug. 12 and 19 with considerable interest and am submitting a few ideas with reference to methods of keeping the costs of track maintenance, also some of the things which would enter into these costs. A system of track maintenance costs would undoubtedly be very enlightening to the track department of any railway company. Whether the unit used is track-mile, car-mile or ton-mile the information obtained would be of great value in determining which pieces of track were demanding large expenditures to maintain them in good condition. In my opinion the ton-mile unit would give the most satisfactory results as it is the tonnage of trains and their frequency which cause track to deteriorate, action of the elements and the speed of trains not being considered.

The speed of trains also, however, enters into maintenance costs of open track construction, as it requires more labor to keep up track where train speeds are high than it does where they are low. The speed factor would be difficult to include with the degree of accuracy desired where all classes of trains operate over the same track. This could probably be solved best by dividing a road into speed classes, where the speeds of trains varied materially on different portions of the road. A given rating could be determined by calculating the average speed of all trains between stops.

The resultant costs from the ton-mile unit would not be any more satisfactory than those by the track-mile method unless each different type of construction was accounted for separately. Costs must be kept on each different type of construction in order to determine which type is the best for the tonnage operated over it. Records of this character covering a period of years would enable the engineer to determine the most economical type of construction for a predetermined tonnage. The subsoil conditions in some localities will necessitate better construction to obtain satisfactory maintenance costs than in others. Paving maintenance costs should be recorded in connection with each type of track construction and kept separate from the track costs. It should be divided into two charges—one for repairs made necessary on account of defective track and one for repairs necessary on account of street traffic.

L. A. MITCHELL,  
Superintendent of Roadway.

THE CINCINNATI TRACTION COMPANY  
CINCINNATI, OHIO, Aug. 22, 1916.

To the Editors:

The editorials on "A Unit for Comparing Track Maintenance Costs" in your issues of Aug. 12 and 19 refer to a subject in which I have been greatly interested for years, but I am just as far from a satisfactory conclusion now as when the question first suggested itself to me. The trouble is that with any property that has been in existence for a number of years, and most of them go back fifteen years or more, a number of types of track construction are used, varying materially as to track foundation, drainage, kind and spac-

ing of ties, paving foundation, paving and type and depth of rails. All of these enter as factors, regardless of the tonnage loads that pass over the tracks. Again, the proportion of tangent tracks to special work should be considered, but this will have to be handled separately.

The question of grades is also of considerable moment, particularly where sand is used, with resulting heavy rail depreciation. Consider points where the grades are between 8 per cent and 10 per cent, such as exist in this city in a number of instances, and up to and over 12 per cent in others, with curves in connection with tangent tracks, both horizontal and vertical. Conditions such as these naturally affect the cost of track maintenance, if indeed they are not governing factors. I agree with you that the whole subject is one which can well be taken up by the way committee of the American Electric Railway Engineering Association to determine if possible some definite plan of action.

I suggest, however, that the types of track recommended by the way committee be accepted as standard, and those types conforming most nearly to them be classed as similar construction, so as to start off with some basis for computations. Then the per cent of grades and, later, the extent of tonnage may be considered and weights determined. Special work would have to be handled separately, but would not involve quite as many features to consider as tangent tracks.

I suggest that the essential features of construction be divided into three classes for the various types, as follows:

Sub-structure, consisting of ballast, ties, sub-drainage and labor.

Superstructure, consisting of rails, fastenings, joints and labor.

Paving, consisting of paving foundation, paving, surface drainage and labor.

This classification is different from standard practice, but would simplify the keeping of cost data, and is suggested simply as an outline.

So far as grades are concerned, everything except the rails could be considered on the same basis, with some predetermined value, based on an increase for each per cent over 6 per cent. The question of deferred maintenance is one that should also be considered, but it is doubtful if anything but actual expenditures should be included. E. H. BERRY, Engineer of Roadways.

### Selling Securities to Patrons

H. M. BYLLESBY & COMPANY

CHICAGO, ILL., Aug. 26, 1916.

To the Editors:

I just looked over the ELECTRIC RAILWAY JOURNAL of Aug. 12 and must say that you gave a very splendid treatment to the article concerning "Selling Securities to Patrons." This is by far the best description of what we are trying to do which has so far appeared.

The editorial entitled "Popularizing Utility Ownership," on page 256, I read with very keen interest. The reasoning, to my mind, is entirely correct and conforms with the conditions which we are forced to meet. It is seldom that this vital question is treated in so thorough a way, but it deserves such attention.

The interest which is spreading throughout the country is shown by the fact that the Colorado Electric Light, Power and Railway Association has asked me to present a paper on customer ownership at their convention in September, which invitation I have accepted.

W. H. HODGE, Publicity Manager.



## Eight-Hour Bill and the Electric Railways

Secretary E. B. Burritt of the American Electric Railway Association is in Washington urging the inclusion in the eight-hour railroad bill now before Congress of a clause exempting interstate electric railways from its provisions. Reports from Washington on Sept. 1 state that the Senate committee on interstate commerce at a meeting held on the night of Aug. 31 had agreed to amend the bill so as to make its provisions not applicable to electric interstate railroads or to steam railroads of less than 200 miles in length. As the measure was intended to cover steam railroad conditions, the justice of the exemption of the electric roads is obvious. Henry S. Lyons, secretary Boston Elevated Railway, has also been in Washington during this past week associated with Mr. Burritt in presenting the electric railway side of the case, and many telegrams have been sent to senators and members of the House by electric railway companies since the measure was announced, urging that this exemption be made.

Present reports indicate that there will be no strike next week on the steam railroads, but earlier in the week when the strike appeared imminent, the effect on electric railway traffic received very careful consideration by all electric railway companies. Undoubtedly the interruption of steam railroad service would make the facilities offered by the electric railways even more important than they are at present. Some interurban managers in the central states interviewed by a representative of this paper said that owing to their limited coal supply they feared that they would have to reduce rather than increase the number of their cars in operation if the strike should occur. They would thereby conserve their coal and other supplies and be able to keep their roads open longer, in case the steam railroad strike should be prolonged.

## New Signal Installations on Electrified Steam Roads

The Chicago, Milwaukee & St. Paul Railway has completed the signaling of 134 miles of its electrified section, comprising stretches between Lennep and Three Forks and between Piedmont and Finlen. The signaling now being installed will cover the remainder of the 440-mile, 3000-volt d.c. electrification. The road, which is single track, uses the double rail propulsion return system. The power for the signals is transmitted by a 4400-volt, 60-cycle transmission line supplied by substations located thirty miles apart. Line transformers having a rating of 4400 to 110 volts are provided at each signal location.

The track circuits are fed from 0.5-kva. track transformers having a 110-volt primary and an 18-volt secondary. Two-position vane track relays are used with a reactor in series with the transformer leads. The normal pressure on the track element of this relay is one volt and on the local element, 110 volts. The line relays used in this installation are of two types, the three-position vane and the two-position single element vane.

On the heavy 2 per cent grades impedance bonds having a capacity of 1500 amp. per rail are used to carry the propulsion current. The impedance bonds used on lesser grades have a capacity of 500 amp. per rail. The light signals are of the three-light type, having red, green and white indications. Each lens is illuminated by a main lamp and a pilot lamp. The range of these light signals in day time is 3000 ft. under

normal conditions and 2000 ft. under the most unfavorable conditions.

The Pennsylvania Railroad is soon to begin the work of electrifying its Chestnut Hill branch on which a 11,000-volt, 25-cycle a.c. propulsion system will be used. The signals and locking circuits will be controlled from forty-three two-rail return and twenty-seven single-rail return track circuits. The propulsion current will be carried by means of thirty-five 200-amp. impedance bonds and by six 75-amp. bonds. The remarkable success achieved by the position-light signals used on the Philadelphia-Paoli division has caused the Pennsylvania Railroad to continue their installation on the new electrification. The track relays will be of the brakeless centrifugal frequency type. The vane frequency line relays will draw their energy from 1-kva., 110-volt, 60-cycle transformers. At each signal location 3300 to 110-volt transformers will step down the power from the signal transmission line. The maximum length of track circuit will be 3800 ft. and the minimum 1000 ft.

The signal material for both the above mentioned installations is being furnished by the Union Switch & Signal Company, Swissvale, Pa.

## English Tramways and the War

Some of the problems that have been confronting British tramway operations during the second year of the European war are well shown by the following extract from an editorial in *The Electric Railway and Tramway Journal* of Aug. 4:

"As to revenue, the great majority of our tramways have done remarkably well during the second year of the war. Some of the larger centers of population have scored continuous and notable increments, and our weekly traffic returns, as a whole, show a great preponderance of the plus over the minus signs. The working classes almost everywhere are earning more—in many cases much more—than average wages, and are spending their money freely, to the great benefit of the tramways.

"In respect of expenditure, it goes without saying that in almost all the items the cost has been higher. Wages have been advanced all round, allowances to dependents are steadily growing, and the cost of materials, fittings, etc., has not only gone up by leaps and bounds, but is befogged by the difficulty which exists in many lines of procuring supplies at any price whatever. The prices of certain materials and supplies have mounted much higher, and even where some attempt has been made to insure co-operative buying such things as tires have reached about \$50 per ton—a price which before the war would have been deemed unthinkable.

"On the whole, it appears to be a fair and reasonable conclusion that our tramways have done well in the teeth of great difficulties. They are, perhaps, piling up a certain number of troubles for themselves when the war comes to an end, but they cannot avoid these, seeing that they cannot obtain either the labor or the materials to keep their tracks, cars, sheds and so on in proper order. The postponement of repairs and adequate maintenance consequently is unavoidable, and it is up to the managers to do their best to keep going their services during the war, and leave what may happen afterwards to the arbitrament of circumstances. They cannot do either less or more than that."

On Aug. 1, during the visit of Judge and Mrs. Elbert H. Gary to the Philippines, they were the guests of honor at a dinner tendered them by C. Nesbit Duffy, vice-president Manila Electric Light & Power Company. The dinner was attended by prominent government officials.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Fool-Proof One-Man Car—Improved Paint Gun for Car Shops—  
Motor Problems Imposed by Modern Car Design—New Copper  
Clad Steel Wire—A By-product of the Babbiting Furnace—  
Serviceable Frogs Made from Scrap by Arc-Welding

### Equipment of the "Safety" Car

On This Car the Air Brake Valve Performs Several Extra Functions and Air Is Used Also in Connection with the Control

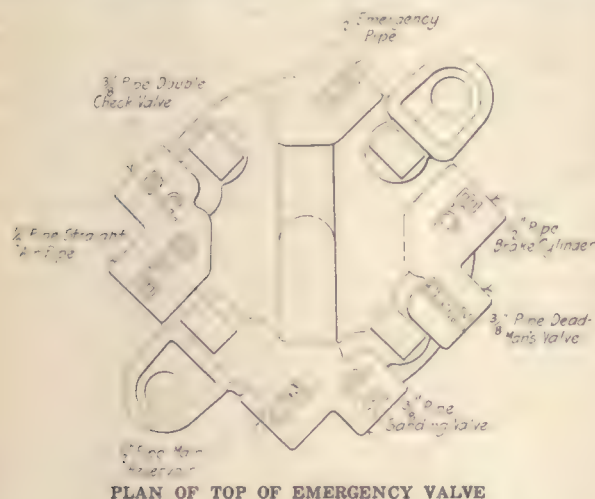
The flexibility of compressed air has been utilized by the Safety Car Devices Company, St. Louis, Mo., in the design of a safety car equipment. This provides for air operation of doors and steps, brakes, controller safety release and door locks, as well as the operation of other minor devices. The whole scheme of operation of the several parts is so interwoven that it is practically impossible to operate incorrectly without calling into play one or more of the safety devices. The following details relate to the one-man car brake and safety control equipment.

#### THE BRAKING EQUIPMENT

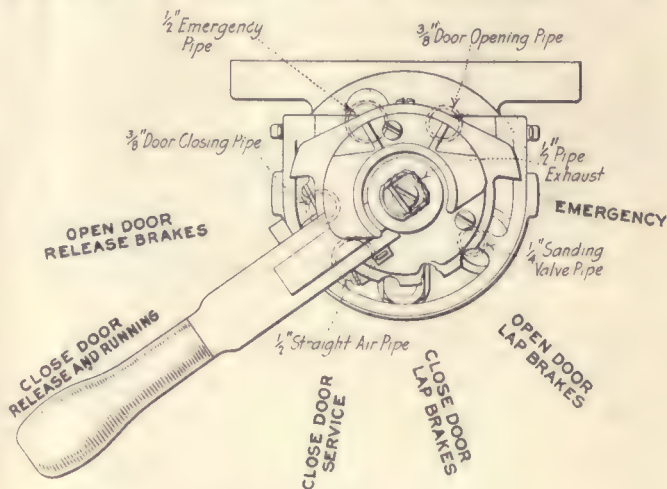
The brake equipment is of the Westinghouse semi-automatic type which embodies an automatic emergency feature whereby the brakes are automatically applied in

lighter than standard sheets and with brazed head and body seams, a safety valve and a Type-28 brake valve. There are also an air gage showing main reservoir pressure, a Type K emergency valve, a special light-weight brake cylinder, a supply limiting valve for the sander, and the necessary switches, fuse blocks, etc.

Through the brake valve the operator controls not only the brakes, but also the doors and steps and the sand valve. As indicated in an accompanying illustration, the handle has six positions: Release (doors open), release (doors closed), service, lap (doors closed), lap (doors open), and emergency (doors open). Two release and two lap positions are provided for the following reasons: When a car is stopped on a level it may be desirable to release the brakes immediately in order that a prompt start may be made when the entrance and exit of passengers is completed. Consequently there must be a position in which the brakes will be released when the door is opened to permit passengers to enter and leave the car, and another position in which the brakes will be released when the door is closed for the



PLAN OF TOP OF EMERGENCY VALVE



PLAN OF TOP OF BRAKE VALVE

emergency with full force in the event of the breaking of pipes, etc. The safety control devices insure that the motorman must be at his post and attentive to his duties before the car can proceed, and he must remain alert to keep the car moving. Should he become incapacitated or remove his hand from the controller handle for any reason when the power is on the power will be automatically cut off, an emergency application of the brakes will be made, sand will be applied to the rails, the front door will be opened and the steps lowered, and the rear door will be unlatched so that it can be opened by hand if so desired. An emergency application of the brakes will produce the same result.

Taking up the braking equipment more in detail, the following equipment for a single-end car may be noted:

The compressor is of the Westinghouse duplex gear-driven type which has been in operation for several years. In connection with this are used a CD-1 light-weight compressor governor, a main reservoir made of

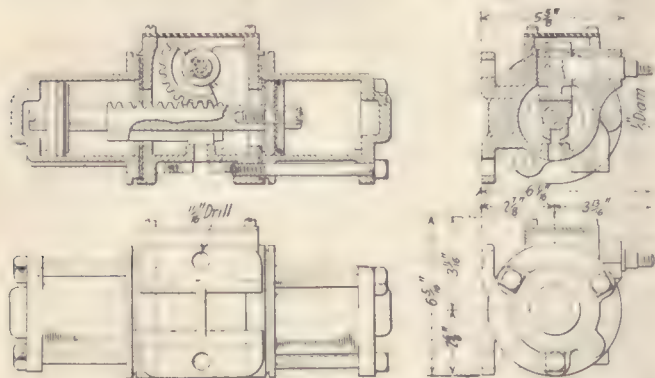
sake of safety while the car is running. To prevent any possibility of the doors remaining open while the car is running the brake valve handle is returned from release (doors open) position to release (doors closed) position by a spring as soon as the operator removes his hand from the brake valve handle. While the car is standing on a grade, the brakes must be held applied, and consequently there must be a brake lap position in which the doors will be open to permit the passengers to enter and leave the car, and also another brake lap position in which the doors are closed, as when a car is being retarded for a stop or a slow-down.

The brake valve also embodies a pneumatic sanding feature, whereby sand may be applied to the rail in any position of the handle by the mere pressing down of the handle.

The emergency valve operates to apply the brakes, open the front door, lower the steps, unlatch the rear door and blow sand onto the rails should the emergency



line be ruptured from any cause or should the operator make an emergency application. In addition, the valve operates to cut off the power to the motors should the motorman for any reason remove his hand from the controller handle with the power on. The supply limiting valve for the sander cuts off the flow of main reservoir air through the emergency valve to the sand box during emergency application when the main reservoir



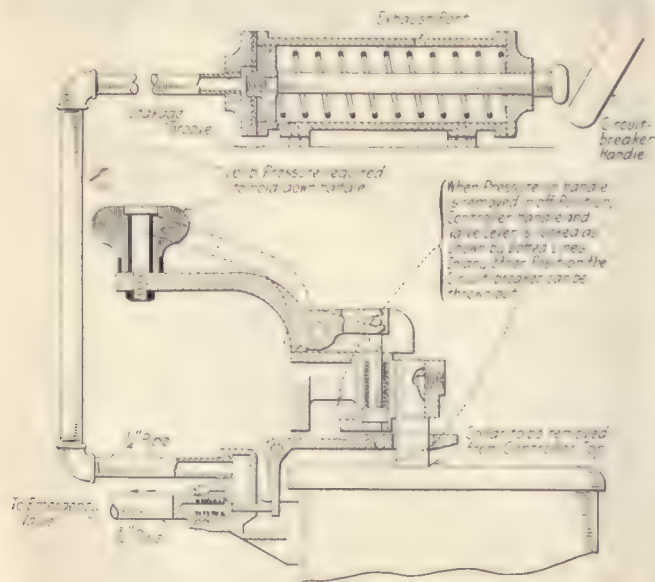
DETAILS OF DOOR AND STEP CONTROL CYLINDER

pressure has been reduced thereby to a predetermined safe pressure for the operation of the brakes. This valve is omitted if the automatic sanding feature is not desired, and in this case the sand valve connection in the emergency valve is plugged.

#### THE SAFETY CONTROL DEVICES

The essential safety control devices are the pilot valve and circuit breaker cylinder operated by the controller handle, the rear door unlatching device, the door and step controller and a double check valve which prevents the escape of air from the door and step controller through the brake valve in case the doors are opened by the emergency valve operating automatically or normally.

The controller handle attachment is illustrated in an accompanying drawing, the handle and valve being so



CIRCUIT-BREAKER CONTROL ACTUATED BY CONTROLLER HANDLE

designed that they can be applied to any type of manually-operated power controller. As explained above, if for any reason due to accident or carelessness the operator's hand is removed the brakes are automatically applied, the power circuit opens, the front door opens and the rear door unlatches.

The door and step controller is in the form of a double-acting cylinder, a portion of the piston rod of which has a rack machined thereon. This meshes with a pinion the shaft of which is connected by a series of rods and levers to the car door and steps.

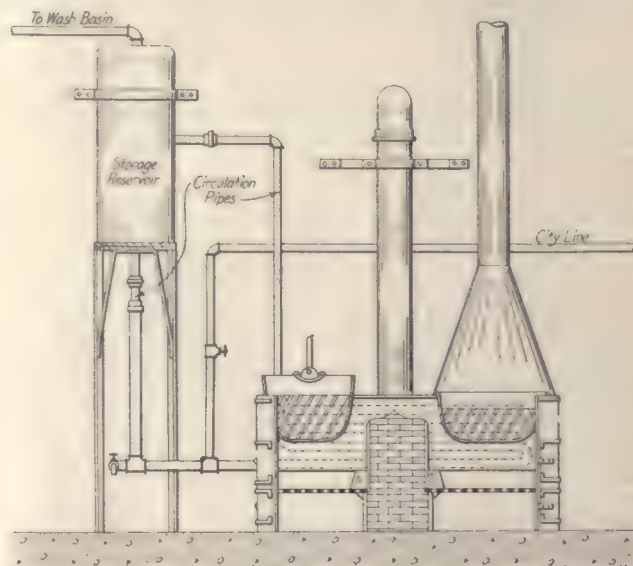
In addition to the safety features a rear sander cut-off valve is provided to prevent waste of sand on the rear sander in emergency applications. This is automatically taken care of by the brake valve in normal operation, but there must be some provision to cut off the supply of air to the rear sander when an emergency application is made. Hence, a valve is interposed between the emergency valve and the sander, and is so installed in connection with the brake valve that it is closed when the brake valve handle is removed and open when the handle is in position on the rotary valve key. Hence the rear sander is cut out and only the sander on the operative end of the car is effective. Door controller cut-off valves are also provided to permit automatic opening of the front door when an emergency application is initiated, either by the brake valve or the emergency valve, but to permit unlatching only of the rear door.

### Babbitting Furnace Heats Water

BY R. H. PARSONS  
Electrical Foreman

An economical method of obtaining hot water is always possible in shops where babbitting furnaces are used. It can be provided by installing coils of pipe within or around these babbitting furnaces as shown in the illustration herewith.

In the plan illustrated the coils were connected to a large cylinder formerly used as a car air reservoir, and taps were made to the city water line and to the wash basin. The space between the furnaces and the wall was utilized for the heating coils. If it had been desired to pipe the water to distant points in the building, an additional cylinder or reservoir could have been installed near the wash basin and connected to the heating coils in the same manner as the original one,

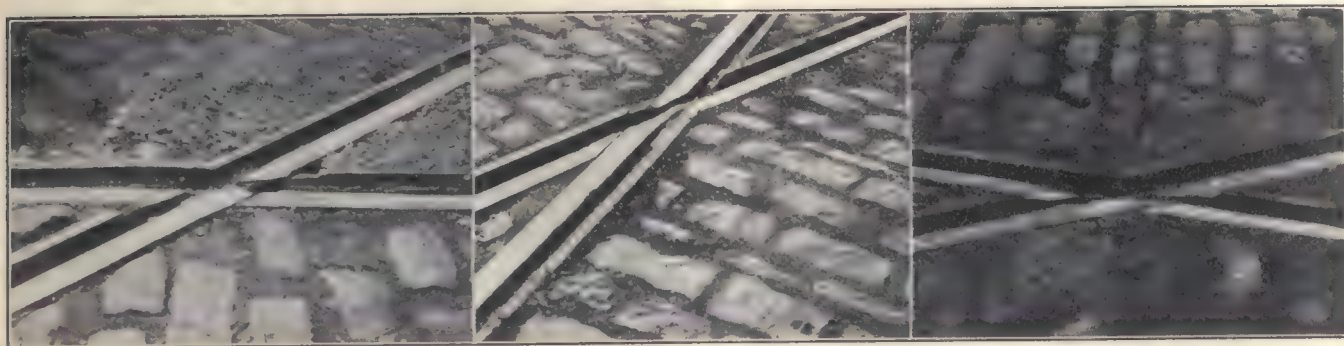


BABBITTING FURNACE UTILIZED FOR HEATING WATER  
Heating Coil Is Between Back Wall of Furnace and Wall of Room

thus overcoming the necessity of drawing off a quantity of cold water each time before the hot water begins to run.

To keep up this equipment no extra fuel nor attendants are necessary, and hot water is available all the time.





FIGS. 1, 2 AND 3—FROGS THAT HAVE BEEN IN SERVICE FROM TWO TO THREE YEARS AND ARE SUBJECT TO A TRAFFIC OF FROM 145,000 TO 411,000 CARS PER YEAR

## Home-Made Frogs

### Scrap Iron and Joint Plates Converted into New Frogs by Arc-Welding

BY C. BENHAM, JR.

Assistant Engineer New York State Railways, Rochester Lines

Frequently unforeseen failures of special work occur in pieces which must be replaced on the shortest possible notice, making it impossible to resort to the usual course of ordering the piece from a special work manufacturer. Large properties that make a regular practice of manufacturing their own special work can readily take care of such emergencies but lines not so equipped are left to their own devices.

Before arc welding came into use, a number of frogs were made by this company by bolting rails together and riveting the bottom flanges to a base plate on the same general plan as they are now made with the welder. These have worn remarkably well, the oldest one in the track at present having been placed in the summer of 1911. This frog has been subject to a traffic averaging 146,500 cars per year, but will soon have to be replaced. The frogs made with the welder are much more rigid than the bolted frogs, as there is no possibility of any nuts or rivets working loose. They also have a flange bearing through the center, and it is expected that these will wear a much longer time than the old type.

In making these frogs, the rail receiving the greatest traffic is not cut except at the head and guard to conform with the head and groove of the other rail. If the curved rail receives the lightest traffic it is first bent and then cut to fit. Standard joint plates bent to conform with the angle of the frog are used to fasten the rails together. Pipe separators are used to maintain the correct spread and the whole is bolted together and checked with the measurements, taken in the field, on the frog to be replaced. The base of the rail is then spot welded to the base plate at a number of points and the frog checked again before proceeding with the heavy welding. If the heavy welding is proceeded with immediately, there is great danger of the base plate buckling and drawing the whole frog out of shape. The plates at the center are welded top and bottom to the rail, the

welding at the bottom being heavy enough to weld the plate, bottom flange of the rail and the base plate all together.

The grooves are filled in with the welder at the point and about 8 in. along each arm to form a flange bearing and then ground down to a smooth running surface. A hard grade of steel is used to form the flange bearing, soft iron being used in welding the plates and rail together. This flange bearing is one of the most important points, since it is on this that the smooth riding and wearing quality of the frog depends. This feature can best be seen in Figs. 5, 6 and 7. The

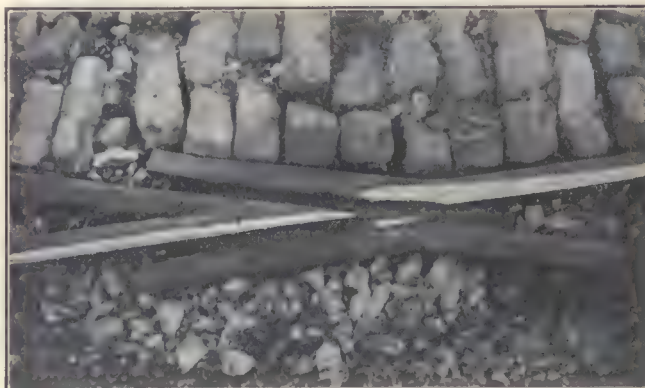


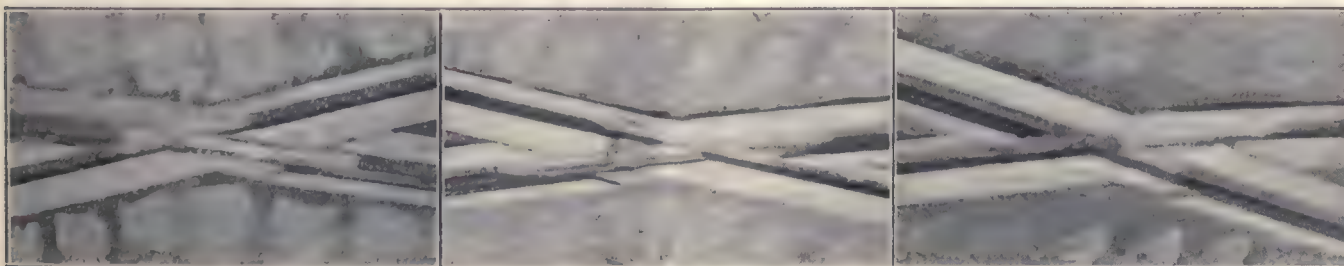
FIG. 4—FROG PLACED AT LAKE STREET AND DRIVING PARK

bolts are pulled up as tight as possible and the nuts welded so that there is no possibility of their working loose.

In the accompanying illustrations, Fig. 1 shows a frog at State and Central Streets placed in December, 1914. This piece is subject to a traffic averaging 41,100 cars per year. There was no flange bearing on this frog and it has worked loose. The fine material is buckwheat stone placed over temporary paving repairs.

The frog in Fig. 2 at State and Lyell Streets, was placed in June, 1914. A traffic of 146,500 cars per year passes over this frog.

The frog in Fig. 3, which was installed in the same



FIGS. 5, 6 AND 7—INSTALLATION OF FROGS SUBJECT TO A TRAFFIC OF MORE THAN 200,000 CARS PER YEAR



## COST OF MATERIAL AND LABOR FOR MAKING A FROG

1/4-ton scrap rail and joint plates, at \$13.....	\$4.30
Scrap base plate.....	3.00
40-lb. welding iron, at 5 1/4 c.....	2.10
10-lb. welding steel, at 15 1/4 c.....	1.50
Bolts .....	.60
Total material .....	\$11.50
Blacksmith foreman, 24 hours, at 40c.....	\$9.60
3 helpers, 72 hours, at 30c.....	21.60
Total labor .....	\$31.20
Grand total .....	\$42.70

layout in October, 1913, is slightly loose, having no flange bearing.

The frog in Fig. 4 at Lake and Driving Park is made of 70 lb. A.S.C.E. rail and was laid in July, 1916. A traffic of 11,500 cars per year passes over this frog.

The frog in Fig. 5 at North and Central Streets was placed in May, 1916, and is subjected to a traffic of 227,500 cars per year.

The frogs in Figs. 6 and 7 at Clinton and Central

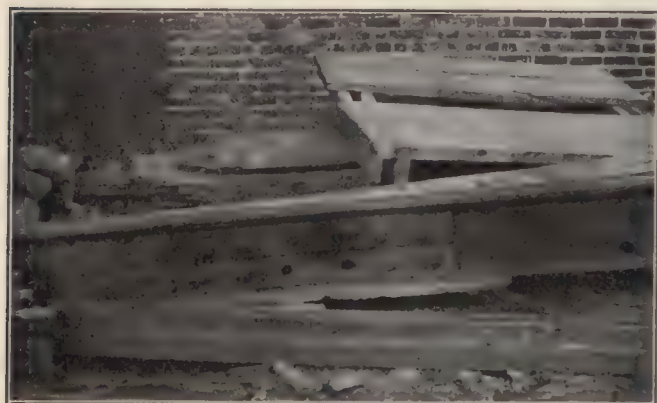


FIG. 8—FROG AFTER WELDING ON BASE PLATE BUT BEFORE WELDING JOINT PLATES



FIG. 9—REPAIR OF MATE

Streets were installed in November, 1915. A traffic of 211,500 cars per year passes over these frogs.

Some of these frogs have been laid too recently to show much wear, but a close inspection showed that they were absolutely solid and were wearing very evenly, having a good flange bearing.

Fig. 8 shows a frog after being fitted together with base plate welded to the rails but before the plates at the center were welded.

Another example in the repair of special work is shown in Fig. 9, showing a mate that has been repaired by joining a piece of rail on the single end. The ball of the rail at this end had broken off, although otherwise the piece was in fair condition. The single end was cut off close to the casting, an old joint plate cut to fit the casting and the new rail and welded to each, and a base plate welded across the joint similar to the base plates on the bottom flanges.

The rail for these frogs is usually taken from pieces of odds and ends that have no more value than scrap except for this purpose; the plates at the center are usually standard joint plates taken from the scrap pile, and the base plate is bought from a local scrap iron dealer at a little over scrap prices, so that the cost is unusually low, as shown in the accompanying table.

This, of course, does not include cost of electricity used in welding or any overhead charge.

## Providing for Closer Gear Centers in Motor Design

The Author Shows Some of the Conditions Imposed on the Designer by Changes in Car Design

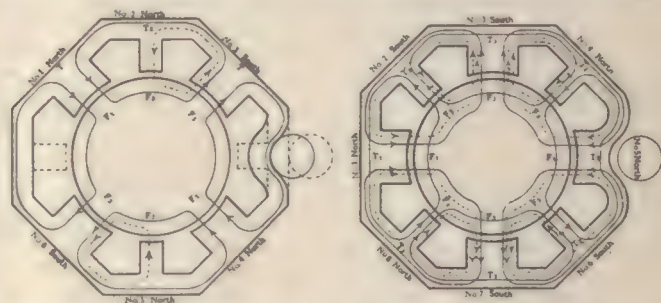
BY F. W. MC CLOSKEY

Railway Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Certain features of the design of the modern street car motor depend directly on the design of the car. Size of wheels, length of wheel base, position of brake rods, etc., are frequently the deciding factors in the selection of armature diameter or type of field windings. Other important design features of the motor may also be affected.

### MOTORS FOR SURFACE CITY CARS

The use of small wheels has introduced new problems in motor construction, one of the first being to overcome the handicap of shorter gear center distance.



1—Distribution of Magnetic Flux in a Four-Pole Motor Having Two Commutating Poles

2—Distribution of Magnetic Flux in a Motor Having Four Main and Four Commutating Poles

One way of doing this is to omit the commutating pole located on the axle side of the motor and proportion the remaining commutating poles so that they will produce the same effect with regard to commutation as would be obtained ordinarily with the full number of poles.

In city service where economy of power requires that the accelerating current be as low as possible, it is desirable in most cases to use the maximum gear reduction possible; that is, it is desirable to use as small a pinion as is consistent with the required strength under the teeth and as large a gear as will permit proper clearance beneath the gear case. A reduction in wheel diameter requires a corresponding decrease in the diameter and number of teeth of the gear to maintain sufficient clearance beneath the gear case. Using a minimum sized pinion, as before, to maintain maximum reduction, this decrease of gear diameter results in the shortening of the gear center distance, which means bringing the center of the armature closer to the center of the axle. This, in turn, results in a restriction of space in the axle region and a difficulty in obtaining room for the field winding. Omitting the commutating pole on the axle side permits the armature to be brought nearer the axle. If, however, only one pole is omitted an unbalanced magnetic pull results, which in most cases can be obviated best by omitting the opposite pole as well.



In a machine having four commutating poles and four exciting poles, about 70 per cent of the ampere-turns on the commutating poles serve simply to neutralize the magnetomotive force of the armature. The remaining 30 per cent are for the purpose of producing sufficient field in the commutating zone to neutralize the sparking voltage in the short-circuited coils. Therefore, in omitting, say, two of the commutating poles, it is necessary only to add to the remaining poles the magnetising turns, or about 30 per cent of the turns of the poles omitted. In actual practice it is necessary to add a little more than 30 per cent and also somewhat to lengthen the commutating poles axially to take care of saturation, etc., but a considerable net saving in copper and iron is secured.

Efficient designs, using half as many commutating poles as main poles may be worked out for motor sizes up to about 50 hp. Above this size the commutating poles are apt to become bulky. This design, besides saving in space, has an advantage in reduced weight, copper loss and less likelihood of grounds, because of their being fewer coils to ground.

It is usual to think of the action of the commutating poles as being independent of the main poles. This is true only in the case of machines having the same number of commutating poles as main poles, and when the windings on the latter are symmetrical; that is, when each pole has the same number of turns. The flux distribution in a four-pole motor having two commutating poles is diagrammatically represented in Fig. 1. It is of interest to note the distribution of flux in different portions of the frame, as compared with that of a non-commutating pole machine. It is obvious that between poles 3 and 4 the flux will be the same. Between poles 2 and 3 the total flux carried by the frame is greater than on non-commutating machines by one-half of the commutating pole flux. Between poles 1 and 2 it is less by one-half of the commutating pole flux. It therefore follows that the frame may be made of smaller sections between poles 3 and 4 than between poles 1 and 2, or poles 2 and 3. The latter two sections will, however, be made the same because with reversal of direction of rotation, the conditions between poles 1 and 2 will be the same as shown between poles 2 and 3 in the diagram.

#### MOTORS FOR ELEVATED AND SUBWAY CARS

In the design of railway motors of about 150 hp. and up, such as are used in elevated and suburban service, as a rule the motor space is not as restricted as in the case of surface cars. However, cases occasionally arise where the gear center distance must be made shorter than normally would be required.

The conditions here involved are different from those in the smaller motors for surface cars, in that it is customary to have a main pole at the axle instead of a commutating pole. One advantage of this is that the brushes and brush holders are more readily accessible, inspection being made usually from underneath the car instead of through a trap in the floor of the car, as is the case generally with street cars. The location of the main pole at the axle requires that the brush holders be rotated on the 45-deg. line, bringing them nearer the axle, where they are more readily inspected.

Shortening the gear center distance results in a reduction of the space for the main field windings at the axle side. This condition may be overcome by proportioning the exciting coil at the axle side with as many turns as the restricted space will permit, and designing the top and bottom coils with a greater number of turns, such that the sum of the ampere-turns on the side and top coils will be sufficient to produce the required flux. The coil on the other side of the motor opposite the axle

should, of course, have the same number of turns as that on the axle side.

In the above method of winding, the design of the commutating poles is somewhat influenced by the number of coils on the main field poles. With the same number of coils on all main poles the design of the commutating poles would be practically independent of that of the exciting coils.

The distribution of flux in the several magnetic circuits is shown in Fig. 2. From the diagram the following deductions are obvious: First, the flux in main poles 3 and 7 exceeds that in main poles 1 and 5 by an amount equal to twice the flux induced in each of the commutating poles by the unbalanced magnetomotive force due to  $T_2 - T_1$  turns on poles 3 and 7. Second, the flux in commutating pole 2 is weakened and that in commutating pole 4 is strengthened by the flux induced in them by  $T_2 - T_1$ . These two statements are equivalent to saying that the magnetic unbalance is proportional to the difference in the number of turns on the main poles. For, if the unbalancing of the main field turns is carried so far as to make the flux induced in pole 2 by the ampere-turns  $T_2 - T_1$  equal or exceed that induced in this pole by  $T_2$ , the flux in commutating poles 2 and 6 will be completely neutralized or even reversed.

These statements are all based on the assumption of unsaturated magnetic circuits. When the magnetic circuits are partly saturated, the difference between the fluxes in poles 1 and 3 and also in poles 2 and 4 will be reduced. In other words, the weakening of poles 2 and 6 is greater than the strengthening of poles 4 and 8, with a result of weakened commutating flux. This can be compensated for by additional turns on the commutating poles or by more liberal designs in other respects.

## Copper-Clad Steel Wire

The Method of Manufacturing This Bi-metallic Wire Is Described and Test Data Are Given

The Page Woven Wire Fence Company of Monessen, Pa., has secured the exclusive right to draw and sell "Aristos Copperweld" copper-clad steel wire, which is made from rods manufactured by the Copper Clad Steel Company, Pittsburgh, Pa.

"Copperweld" copper-clad steel is manufactured by taking a steel bar about 4 in. in diameter by about 30 in. long, pickling, cleaning and covering with a specially prepared flux. This bar is then placed into a mold which is  $5\frac{1}{8}$  in. in diameter by about 30 in. long. The bar and mold are then placed in a furnace and allowed to remain there until the desired temperature is obtained, when copper heated to a temperature of 1980 deg. is poured over the steel bar, filling the space between the bar and the mold. This forms a "copperweld" bar, which is  $5\frac{1}{8}$  in. in diameter by about 30 in. long. This bar is then reheated, hot rolled and drawn into wire.

This wire has an absolute weld between the copper and steel, without voids. It is of such a nature that torsions, twists, strains, hammering, etc., will not cause the copper covering to be separated from the steel center or core. Even changes of temperature from extreme heat to a sudden plunge in cold water have no effect, it is declared, on the weld. The material is, furthermore, proof against external corrosion to the same extent that copper is, and as the weld is said to be perfect no moisture can enter between the two metals—hence electrolysis can never take place.

After the wire is drawn it is given the most severe tests for bending qualities, breaking strength, torsion, elongation and conductivity.



According to the claims of the maker, the wire has a tensile strength about 60 per cent greater than hard-drawn copper wire of the same size, and will stand approximately 126 per cent more strain than copper wire before reaching its elastic limit. The wire also weighs approximately from 7 per cent to 10 per cent less than copper wire of the same diameter and length, and is therefore not only cheaper in first cost but, on account of its greater strength, cheaper in maintenance. The wire is furnished in two grades of conductivity, namely, 40 per cent and 30 per cent, and also in a mechanical grade. Under special arrangements higher grades of conductivity can also be made. The material is manufactured in sizes of from 4/0 to 17 B & S gage. Smaller sizes can also be furnished under special arrangements. The material can also be furnished in weatherproof insulation and in rubber-covered twisted-pair forms.

This wire can be used to advantage on electric railways for trolley wire, signal wire, telephone wire, dead soft annealed tie wire, ground rods, and suspension strands. It is also used for automatic block signals, telephone systems, bond wires, series arc circuits, and transmission lines by railroads and power companies.

### Measuring Granite Block Yardage

The large quantity of granite block used for paving in the electric railway track allowance has introduced the question of the most economical way of measuring the yardage furnished by the granite block manufacturers as a basis for payment. In the issue of the *ELECTRIC RAILWAY JOURNAL* for May 20 Charles H. Clark, engineer maintenance of way, Cleveland (Ohio) Railway, described the results he had obtained by measuring the yardage of granite blocks by weight instead of by count. The substitution of this method for that employing a standard yardage frame has been so successful that this company has now adopted the weight



GRANITE BLOCKS SET IN STANDARD FRAME, AND BEING WEIGHED ON TRACK SCALE

method as standard. Whenever a car of granite block is unloaded every tenth block or every twenty-fifth block is thrown in a separate pile, and when the unloading is completed this pile of block is placed upon a track scale and weighed. A view of the granite block in the process of being weighed is shown.

Where a track scale or a scale of sufficient capacity is not available, the standard frame is quite generally used. Prior to the adoption of the weighing method of measuring granite block yardage, the Cleveland Railway used a standard frame of 8 sq. yd. capacity. This frame was 6 ft. x 12 ft. in size and built of 3-in. plank. A view of this standard frame filled with granite block is illustrated. As in the case where blocks are weighed, every tenth to every twenty-fifth block is thrown in a separate pile as the car is unloaded and the average number of blocks per square yard, as determined after all these blocks cast aside have been set in the frame, represent the number of square yards the company pays for.

### Improved Paint Gun Applicable to Railway Work

Portability, Lightness and Adjustability Are Qualities for Which the Designers Aimed in This Equipment

A large proportion of the railway equipment which requires painting is either so inaccessible or so irregular in shape that it is difficult to use the ordinary paint brush. The paint gun has, therefore, found an important field here, and even for use on large and exposed surfaces the speed and quality of the work done by the paint gun have made it a practical and popular tool. The Spray Engineering Company, Boston, Mass., has just placed on the market a portable paint gun having several special features which are said to simplify the operation, at the same time giving improved results in the quality of the finish of the work.



PAINT GUN SHOWING DETAILS OF ADJUSTMENT

As shown in the accompanying illustrations, the outfit consists of the paint gun proper, connected by flexible hose to a portable unit which comprises the control head and pressure tank. The gun has two adjustments, a round cap at the nose which screws out and in, thus regulating the flow of paint, and a knurled stem at the rear which regulates the amount of air used. These two adjustments determine the proportion of the air paint for any class of work, while the control trigger regulates the rate at which this mixture is sprayed. The weight of the gun is a little more than a pound.

The control head comprises an air strainer, a tank pressure gage, and a reducing valve. The function of this valve is to make the tank pressure independent of the air supply pressure. In this way both the air and the paint can be supplied to the gun at constant pressure, adjusted to suit the material which is being used. The tank has a plug in the base by which it can be filled or emptied without disturbing the control head. The construction of the apparatus is rugged throughout and designed to stand hard usage.

While the word "paint" has been used in referring to the material to be sprayed, it is understood that the outfit can also be used with varnishes and lacquers of different thicknesses. Owing to the wide range of ad-



PORTABLE PAINT GUN; OPERATION OF SPRAYING A SMALL IRON CASTING

justment to suit the material being used, this paint gun is serviceable for many classes of work. The painting of car bodies, trucks, brake rigging, fenders and metal work which is hard to reach with a brush is an instance in which the paint gun could be used.



## LONDON LETTER

Edinburgh Considering Electric Haulage—Details of Services of London County Council Tramways in War Time  
—Miscellaneous Financial Reports  
(From Our Regular Correspondent)

The annual conference of the Municipal Tramways Association will be held in London on Sept. 21 and 22 at the Surveyors' Institution. Following a meeting of the executive council, the conference will open on Thursday morning, when Peter Fisher, general manager of the Dundee Corporation Tramways, will deliver his presidential address. This will be followed by a paper entitled "Some Notes on Passenger Transportation in Large Cities" by J. M. McElroy, general manager Manchester Corporation Tramways. In the afternoon a joint paper on "Utilization of Tramways for Goods Traffic" by G. W. Holford, general manager Salford Corporation Tramways, and W. Clough, general manager Bury Corporation Tramways, will be discussed. On Friday morning there will be another meeting of the executive council and also a meeting of the managers' section, after which the annual business meeting of the association will be held. It has been decided that no social functions shall take place, and therefore no arrangements have been made for the usual association dinner or excursion.

The Corporation of Edinburgh has asked for a report from tramway experts on the question of converting its whole tramway system to electric haulage at the termination of the present lease of the lines to the Edinburgh & District Tramways. The present method of traction, which is by cable, was adopted before the electric system was fully developed, and was favored because it did not disfigure the streets—particularly Princes Street—with poles and overhead wires. But traveling with it is slower than with electrically propelled cars in other cities, and there are frequent stoppages caused by faults in the cables, or mistakes made by the drivers in gripping or slipping the cables at the stopping places or at corners. The corporation hopes to be able to have the electric cars ready to start at midnight on June 30, 1919, when the lease of the present tramway company comes to an end. Its experts, however, have asked for further time to investigate the whole matter, which is, they state, very complex. It is understood that the committee of the corporation which is dealing with the subject will, in consequence, ask for an extension until September, when, it is hoped, the policy of the corporation may be agreed upon.

The Corporation of Bristol is seeking powers to extend, for a further period of one year from Oct. 31 next, the time during which it shall be entitled to exercise its option of purchasing the Bristol tramway undertaking. While many ratepayers who are opposed to purchase have not changed their views, they are not likely to embrace the opportunity offered to them of giving notice of opposition.

The general purposes committee of the Middlesbrough Town Council has appointed a sub-committee to consider the question of taking over the electric tramway system in the district. The powers of the local electric tramways company expire in 1918, and six months' notice of any intention to purchase must be given to the tramways company. Many things, it was said, might happen before 1918. There was the possible variation in the distribution of coal after the war, and the substitution of benzol and petrol. This might revolutionize the whole question of street traction, and was one of the many points that would have to be considered by the committee.

The London County Council tramcars are carrying more traffic at the present time than they have ever done before. A recent weekly return showed a record revenue of £52,300. Facilities for getting out beyond the crowded parts of the town by means of motor buses have recently been very greatly restricted, and the trams have in consequence benefited. Great success has attended the system of car trailers, which was greatly extended recently in order to save labor.

Details respecting some of the services rendered by the London County Council Tramways in connection with the war have been given in a report presented at a recent meeting of the council. Of the 11,500,000 passengers carried by the council's cars, only a small proportion represents pleasure

traffic. The majority of the passengers use the tramcars for traveling to and from their work in connection with the industry and commerce of London, while tens of thousands use the cars to reach munition works in various parts of the areas served by the tramways system. Of the various passenger carrying services the council's tramways were alone in a position to expand the normal services to an extent at all commensurate with the rapidly growing needs of Woolwich. As an instance of the efforts made by the tramways undertaking to further the nation's interests in connection with the war, the changes in the Woolwich tramway services may be mentioned. In July, 1914, just before the outbreak of war the maximum number of the council's tramcars arriving at a certain point during the busiest half hour was forty-one. This number has now been increased to eighty-six, an addition of 110 per cent. The number of cars arriving at the same point each day before the war was 975, but the number is now 1,595, an increase of over 63 per cent. During the busiest hour to-day accommodation is provided for 13,688 people, as compared with 4094 before the war, an increase of 234 per cent. The accommodation provided by motor omnibuses in this district, compared with that provided before the war, shows only a slight increase.

The Woolwich district is not being served to the neglect of other parts of London in which the tramways operate. Other changes have been made enabling the tramways management to meet the altered requirements arising out of the war. The authority obtained to carry an excess number of passengers has proved of considerable assistance in meeting the needs of the arsenal workers. To meet the shortage of men it became necessary to employ women on work formerly done by men, more especially as conductors. To-day there are 1072 women conductors employed on the council's cars. With the same end in view, and to increase as far as practicable the accommodation required by the traveling public, the construction of trailer cars has been expedited as much as possible. Although, the report concludes, during the last two years the problem of meeting the requirements of the traveling public has been a difficult one, the needs of the country have been borne in mind; the services of officers and employees have been lent to the government for national work; from the beginning of the war men have been encouraged to join the forces of the Crown, and substantial allowances have been made to the men enlisting or to their dependents, involving a charge on the undertaking of more than £168,700. This sum will be increased to more than £260,000 by the end of the current financial year if the war continues until March 31, 1917.

The interim dividends of the Metropolitan District Railway, the City & South London Railway and the London Electric Railway were about what had been expected, and being only interims no figures to show how the companies have fared as regards revenue during the last period are available. As the last two railways stood to get a larger proportion of the common pool during the last six months, it was only reasonable to expect larger dividends. The City & South London Railway paid at the rate of 1.5 per cent on the ordinary capital, as compared to nil for the corresponding period of last year, while the London Electric Railway has increased its rate of distribution from 1 to 1.5 per cent. A little disappointment was felt that the Metropolitan District Railway has not been able to increase its rate of dividend on the second preference stock beyond the 3 per cent paid at this time last year, but it is probable that an extra sum has had to go into the line, running, as it does, such a frequent service of trains.

The gross profit on the Wolverhampton tramways undertaking for the last year amounted to £24,893. On motor char-a-banc account a sum of £1,459 was realized, the two sums representing a gross profit of £26,353. A considerable amount of maintenance and renewal work held in abeyance was unavoidable, owing to the depleted labor market and the impossibility of obtaining delivery of certain materials. The mileage run during the year was 1,156,591, as compared to 1,181,309 in 1914-15, the operating cost amounting to 1.573d. per mile as compared to 1.463d. in the previous year. Passenger receipts amounted to £58,250 (an increase of nearly £4,000), and the passengers carried numbered 13,296,146. The motor char-a-bancs covered 119,865 miles.

A. C. S.



## NEWS OF ELECTRIC RAILWAYS

### BAY STATE LOSES 6-CENT FARE CASE

Massachusetts Commission Will, However, Allow Increases on Rural Lines—Criticises Management of Company and Advises Use of Earnings Upon Property

Six-cent fares throughout the system of the Bay State Street Railway, Boston, Mass., were refused on Aug. 31 by the Massachusetts Public Service Commission in a decision which censured the company for mismanagement and urged that dividends be suspended until accumulated earnings should be sufficient to rehabilitate the property. While the company will not be allowed to increase fares in any of its fifteen principal districts, however, the commission suggested that it would give consideration to a request for fare increases in strictly rural sections. The commission virtually assured the company that a new schedule of rates for rural lines "within certain restrictions" would be approved by the commission without further hearing and become effective within thirty days of the time of filing. Thus the main issue of a 6-cent fare is closed in a case that has been pending since November, 1915.

Relative to the districts where the commission concludes that there should be no fare increase it said:

"There is no evidence before the commission which would justify it in permitting the regular unit of cash fare to be increased in the populous centers which are already carrying their fair share of the burden. We also have grave doubt whether an increase in the 5-cent unit in this thickly settled, short-haul territory where jitney competition is so feasible and so prevalent would be of material benefit to the company. It is not a policy which street railway companies generally in this country have thought it wise to adopt. Any increase in the unit cash fare must, therefore, upon the evidence, be disallowed in the present 5-cent zones within or from the centers of the following cities: Boston (including Hyde Park), Brockton, Chelsea, Everett, Fall River, Haverhill, Lawrence, Lowell, Lynn, Malden, Melrose, Quincy, Revere, Salem and Taunton.

"The other lines operated by the company, in general, form part of the interurban routes as distinguished from what may be called urban and suburban portions of the system and are located in less populous districts. If the company wishes to increase the prevailing fares upon these lines (interurban districts), it is just and reasonable in our judgment for it to do so. Certain restrictions upon the discretion of the management in this respect, however, should be indicated."

In regard to proposed zone changes, etc., the commission said:

"The company, in its schedule of proposed fares, has in certain cases provided for an increase of the unit cash fare beyond 6 cents, has introduced certain new fare zones and has made certain alterations in existing zones and transfer privileges. The commission is of the opinion that no changes of this character can be allowed at this time."

The commission, in its voluminous report of forty-eight printed pages on the case, criticised the management of the Bay State Street Railway for the manner of keeping accounts and for failure to provide adequately for depreciation, attributed the weakness of the Bay State system to the original error in judgment of the present owners, said that the property had been allowed to run down in a manner that could not be justified, and stated that "the company has failed to satisfy our minds that additional net income cannot be secured through more efficient management and operation."

Regarding dividends the commission added:

"In order to place the future earning power of the system upon a more stable basis the company must expect temporarily to suspend dividends upon its common stock and turn back earnings into the property. This may seem a drastic prescription, but the situation clearly calls for it."

### BROOKLYN WAGES ARE INCREASED

Employees' Benefit Association Enthusiastically Approves New Plan of Departmental Trustees for Meeting With Management

The Brooklyn (N. Y.) Rapid Transit Company on Aug. 29 announced a general increase in the wages of its employees in the transportation department effective on Sept. 1. This action was taken by the directors of the various operating companies in recognition of the demonstration of loyalty which the employees gave during the recent attempts of outsiders to stir up dissatisfaction in connection with the New York strikes. The increases affect 9216 employees of all classes, from car cleaners to superintendents. The additional cost to the company will amount to about \$650,000 a year.

The new rates for motormen range from 26 cents to 42.5 cents an hour. The minimum rate applies to beginners on the surface lines and the maximum to those in service more than ten years on the elevated and subway lines, the rates gradually increasing to the maximum according to the years of service. Inasmuch as an unusual percentage of the employees of the system have been in service for many years, a large proportion of the total will receive the maximum rates of pay. Elevated and subway motormen will continue to be chosen from those having good records on the surface lines. The present time allowances are also continued, whereby on the surface lines conductors and motormen working more than eight hours a day but less than ten are paid for ten hours' work, and on the elevated and subway lines motormen, conductors and guards working more than seven hours and less than ten receive ten hours' pay.

The following table presents a comparison of the old and new rates as they affect the men engaged in the operation of the cars:

SURFACE CONDUCTORS AND MOTORMEN

	Present Rates Per Hour (Cents)	New Rates Per Hour (Cents)
First year .....	25	26
Second year .....	25	27
Third year .....	26	28
Fourth year .....	27	29
Fifth year .....	27	30
Sixth year .....	28	31
Seventh year .....	28	32
Eighth year .....	28	32
Ninth year .....	28	32
Tenth year .....	28	32
Eleventh year .....	29	33
Twelfth year .....	29	33
Thirteenth year .....	29	33
Fourteenth year .....	29	33
Fifteenth year .....	29	33
After fifteen years .....	29	34

ELEVATED AND SUBWAY MOTORMEN

First year .....	30	34
Second year .....	32.5	35
Third year .....	32.5	36
Fourth year .....	32.5	38
Fifth year .....	32.5	39
Sixth year .....	35	40
Seventh year .....	35	42
Eighth, ninth and tenth years .....	37.5	42
After ten years .....	40	42.5

Conductors on elevated and subway lines who now receive from 23 cents to 25 cents an hour will be advanced from 26 cents to 28 cents an hour, depending upon the years of service, and guards who now receive from 20 cents to 23 cents an hour will receive from 22 cents to 25 cents an hour.

The company also announced on Aug. 29 that the members of the Employees' Benefit Association had ratified by a very large majority the proposed amendments to the constitution of that organization creating in each one of the large departments of the system a set of departmental trustees who would constitute a committee to voice any changes of conditions desired by the employees of such department. This plan, announced by President T. S. Williams on Aug. 17, as previously noted in the *ELECTRIC RAILWAY JOURNAL*, has been enthusiastically received by



the employees. Up to Aug. 29 more than 94 per cent of the members of the association working in the transportation department and more than 86 per cent of the entire membership of the association in whatever department employed, had signed proxies to be voted for the plan of departmental trustees at the special meeting of the association on Sept. 28, when the amendments will be formally adopted.

The plan provides that in case any question arises in respect to any matter affecting working conditions or employment which the departmental trustees may consider worthy of attention, they will arrange for a hearing of the question at issue with the employee or employees affected and the head of the department or his authorized representative. At such hearing the employee or employees affected will have opportunity to discuss fully and in the presence of the departmental trustees the conditions to which exception is taken.

Following such hearing, the departmental trustees will confer with the head of the department or his authorized representative to see whether an agreement can be reached covering the question or questions at issue. In the event that no such agreement can be reached, then the departmental trustee or trustees and the head of the department will respectively prepare and sign statements of the facts and conclusions drawn therefrom, which will be submitted to the president of the Brooklyn Rapid Transit Company for final decision.

On Aug. 30 members of the Employees' Benefit Association in the surface transportation department, the elevated and subway transportation department, the mechanical department, the department of way and structures, the electrical department and the freight department held a special election for acting departmental trustees. According to the announced results, thirty-nine of such trustees were elected in the various departments out of 140 candidates nominated by their fellow-employees. The aggregate vote represented was more than 98 per cent of the employees entitled to vote in the different departments. Thus the men elected take office under the virtually unanimous indorsement of their fellow members in the association. The acting departmental trustees will take office immediately and upon the adoption of the pending amendments to the constitution and by-laws of the association will become officially the departmental trustees of the association to hold office until the next annual meeting.

The Employees' Benefit Association has more than 10,000 members, including fully 90 per cent of the men in transportation service. While the departmental trustees are elected by the members of the association, their good offices are available for any employee or employees on the system.

#### MR. WHITRIDGE RETURNS

##### Commission Charges Said to Be Baseless—Third Avenue Railway Cannot Pay Higher Wages

A meeting of the directors of the Third Avenue Railway, New York, N. Y., on Aug. 30 was attended by Frederick W. Whitridge, president of the company, who had returned from Scotland on Aug. 28. It was the first time Mr. Whitridge had met with the directors since the recent strikes were called on the company's lines. He received power from the board to take charge of the negotiations with the ex-strikers, which have been in the hands of Edward A. Maher, Sr., vice-president and general manager of the company, and after the meeting was over he issued a statement to the effect that he would meet representatives of the employees on Aug. 31 to consider with them the twenty-six requests for changes in rules and regulations. Continuing, he said in part:

"Some of these requests are, I think, superfluous, as the things have already been done. Some of the others may fairly be discussed, and a few the company will be obliged to reject. The request for an increase in wages the company will also be unable to meet. Since Jan. 1 of this year the wages have been increased about \$250,000. I had every reason to suppose at the time of my last conference with the men in July that this was substantially satisfactory, and I hope to be able to induce the men to proceed without now asking for an unreasonable further increase, and thus avoid the delay and expense of arbitration. If the men are not

willing to meet me upon these lines, I am, of course, prepared to undertake such an arbitration and to pay our share of the expense thereof.

"So far as the personal attacks on myself are concerned, which the Public Service Commission for the First District of New York has seen fit to make, I have only to say that those attacks were quite as improper and baseless as any of the others which have been made upon me by this body."

#### ANOTHER INTERBOROUGH WAGE INCREASE

##### New York Company Raises Pay of All Class of Workmen for Third Time in Eight Months—Individual Working Agreements for Men

The Interborough Rapid Transit Company, New York, N. Y., announced on Aug. 30 the third increase in the wages of its employees that has been made this year. The new increase, effective Sept. 3, will affect 12,000 employees and will amount to approximately \$1,250,000 a year. This is in addition to annual increases amounting to \$200,000 made on Jan. 1 and \$300,000 made on Aug. 1 of this year. It thus makes a total annual increase of \$1,750,000 in the company's payrolls during the last eight months. The working day has also been reduced from ten hours to nine.

The present increase applies to shop, powerhouse, transportation and other classes of workmen in the employ of the company. The new rates per day of nine hours for the most important divisions of the transportation group follow:

Conductors:	
First year	\$2.80
Second year	2.90
After second year	3.00
Guards:	
First year	\$2.40
Second year	2.50
Third year	2.60
After third year	2.70
Motormen:	
First year	\$3.50
Second year	3.75
Third year	4.00
Fourth year	4.20
Fifth year	4.20
Sixth year	4.40
After tenth year	4.50
Overtime for conductors, guards and motormen to be paid actual time up to ten hours; over ten hours, time and one-half.	

The new scale of wages has been circulated among the employees with a view of establishing a working day and a satisfactory wage rate that will cover a period of not to exceed two years or until such time as the city becomes interested in the financial results of the operation of the elevated roads and the subway. Separate working agreements have been distributed among the men in the various departments showing in detail the hours that constitute a day's work in all branches of the business and the pay per day that will be given to the men, together with provisions for extra time and overtime. The company has not used and does not propose to use any influence whatever over anyone in its employ as to whether he shall or shall not sign the individual working agreement. It is entirely voluntary on his part whether he does so or not, and there will be no discrimination or any act on the part of any officer of the company permitted because any men do not desire to sign.

This individual working agreement contains the following clauses:

"1. The Interborough Rapid Transit Company employs the undersigned for the wages and hours set forth on the annexed schedule in the subway, until the beginning of initial operation as defined in Subway Contract No. 3, or on the elevated, until the beginning of operation of any part of the railroads as defined in the Elevated Railroad Certificate and (provided the Public Service Commission shall approve when such operation shall begin) until Aug. 31, 1918.

"2. The undersigned agrees to work for the company in such positions as may be assigned to him from time to time (provided there shall be no reduction in position except for good cause) for such wages and hours for such periods.

"3. It is further agreed that if the company shall increase the wages or change the hours set forth on the schedule, the undersigned shall have the benefit of such increase or change notwithstanding this agreement to the contrary.

"4. If, after five years' service in any one class, for physical causes beyond the control of the undersigned, he shall be



assigned to a lower position, he shall then receive at least the low rate wages on the schedule of the class from which he is transferred."

In regard to the above matters, Frank Hedley, general manager of the company, issued a statement on Aug. 30 which said in part:

"Large numbers of Interborough Rapid Transit Company employees have voluntarily come to the president's office and to my office and indicated their desires to have such a working agreement executed that they can be assured that their positions are safeguarded and that the traveling public of New York can be assured that the rapid transit lines controlled by the company will be protected against interference with the continuity of its service for at least a fixed period.

"A few days ago President Shonts received a communication signed by a number of this company's employees who asked for a conference. A conference was arranged for these men to meet to-day. At this conference the question was immediately raised as to whether the employees of the Interborough Rapid Transit Company have a legal and moral right to organize, and I said that I would be glad to hear the grievances or demands of the employees on the assumption that the principles which had been agreed upon in so far as the New York Railways was concerned would also apply to the Interborough Rapid Transit Company. The New York Railways agreement provides that committees of the men have a right to have their individual committeemen, if they desire represented also by spokesmen, appear before the officers of the company to present their cases and, further, that should disputes arise with the management which cannot be settled with the employees the questions in dispute shall be arbitrated, excepting, however, all matters relating to efficiency. Of course, the same procedure will be followed on the Interborough lines.

"The spokesman for the employees at this meeting, Mr. Fitzgerald, brought up the question of wages for several classes of employees, and at this point I handed to him a printed copy of the working agreement between individual employees and the Interborough Rapid Transit Company. This agreement was formulated in conference with the committees representing each of the departments of the road, which committees as a whole represent every department of the system, and these committees stated that they would recommend the terms of the agreement for execution by the individual employees. The agreement is therefore the result of collective bargaining with the chosen representatives of the employees. The unrest or excitement that has prevailed on the Interborough Rapid Transit Company more or less for the last two or three weeks led the management to decide that a change in the working hours of many of its employees and an increase in the rate of wage were the essential things, and while these agreements provide for such changes they do not close the door for our men to continue their negotiations with the management for other requests that they have made. In fact, I invited them to continue their negotiations with me and with their superior officers with the view of arriving at a determination of all discussed matters to the complete satisfaction of our employees and the company."

#### STRIKE FOLLOWS BANGOR WAGE INCREASE

E. C. Ryder, president Bangor Railway & Electric Company, Bangor, Me., on Aug. 23 refused to sign a contract with the local carmen's union which involved recognition of the union and submission of disagreements between the men and the company to a board of arbitration. President Ryder stated that this involved a division of authority to which the company could not assent under any conditions. This demand on the part of the union was made in the face of a recent general increase of 2 cents an hour in the wages of conductors, motormen and carhouse employees, as announced in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

In accordance with votes taken at two meetings, the first on the evening of Aug. 25 and the second at an early hour on Aug. 26, a portion of the conductors and motormen of the company went on strike at 9 a. m. on Aug. 26. During the forenoon there was a limited service on the local lines. President Ryder stated that the company had kept absolute faith with the employees in not importing operatives while negotiations were on, and for that reason it found

some difficulty in keeping up its schedule. It expected, however, to be in a position on Monday, Aug. 28, to run its cars on schedule time.

On Monday the company maintained partial service with a few loyal employees, a few veterans and some new men, but service was withdrawn at night. Since then the length and the amount of service have been gradually increased. Strikers making personal application for reinstatement up to 5 p. m. Wednesday were promised preference, and by Tuesday night five had returned. The company asserts that the strike is practically over as far as it is concerned.

#### STRAW VOTE ON DALLAS VALUATION

City Officials and Utility Representatives Agree to Submit Point of Valuation to People in Hope of Settling Franchise Controversy

The controversy between the city of Dallas, Tex., and traction and electric lighting interests over the valuation that is to be fixed in the new franchises will be referred to a straw vote of the public. This arrangement has been made under an agreement reached between the city officials and the representatives of the traction and lighting interests, J. F. Strickland and C. W. Hobson, who propose to head the new companies that are to take the street railway systems and the electric lighting plant out of the hands of present owners and operate them on a service at cost basis.

The model service at cost franchise approved by the voters of Dallas at an election held on April 4 has been held up by an election contest. This model franchise fixed a valuation of \$7,100,000 for the traction and lighting properties exclusive of the Oak Cliff lines, which are controlled by Stone & Webster and are operated separately by the Northern Texas Traction Company. This was the valuation fixed by E. W. Bemis, utility expert, who made an investigation for the city. The utility interests maintained that their properties are worth \$8,500,000 and outlined their position in a long statement issued to the people of Dallas and signed by Messrs. Strickland and Hobson, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

Following the issuance of this statement, Mayor Henry D. Lindsley and City Commissioners A. C. Cason and Manning B. Shannon, representing the city, issued a statement outlining the city's position in the controversy. This statement, before being issued, was submitted to Messrs. Strickland and Hobson and approved by them as being a true and impartial account of the controversy and the efforts at settlement.

The big point in dispute is that of valuation. It was agreed that this point should be submitted to the voters of Dallas in a straw vote so that a preference might be expressed for the \$7,100,000 or the \$8,500,000 valuation. The traction interests will pay all costs of this vote, and the returns will be made to the city secretary and will be counted by an impartial board composed of one member of the staff of each newspaper published in Dallas.

The statement issued by Mayor Lindsley and the city commissioners is in part as follows:

"As to the question of valuation, the investigation of Mr. Bemis showed, to the satisfaction of a majority of the Board of Commissioners, that the entire electric light property and the entire street railway properties east of the Trinity River were worth approximately \$6,600,000. To this sum there was added by the Board of Commissioners \$500,000 to cover all equities of every character. Stone & Webster, prior to the election, offered to accept a valuation of \$8,500,000, which is the exact figure Messrs. Strickland and Hobson are offering to accept as a valuation adjustment. There is, therefore, a difference between the valuation now claimed by the owners of these public utilities and the valuation actually placed on them by Mr. Bemis of nearly \$2,000,000.

"It is to be remembered that there were no differences whatever between Mr. Bemis and the engineers of Stone & Webster with regard to actual quantities involved or to the unit value of these quantities. The only differences came in considering proper allowance for overhead, construction, financing, etc., expenses, and as to whether depreciation accrued should be deducted from the properties



involved or not. Stone & Webster claimed 36 per cent for such overhead expense and Mr. Bemis claimed that 20 per cent was a reasonable allowance. Stone & Webster asserted that there should be no deduction for accrued depreciation. Mr. Bemis claimed that that which had in part ceased to exist should be deducted in measuring value.

"The negotiations which have led up to the final status outlined in the Strickland-Hobson statement and in the Mayor's statement, although extending over a long period, have not at all delayed the final consummation of these franchise matters. The suit which was brought to contest the April election has not been settled. This case will come up for trial before the three district judges of Dallas County on Sept. 1. If the decision of these judges is appealed from, the city expects a final judgment by the higher courts during the month of October of this year. The administration, of course, is in no way responsible for this litigation. It has done everything within its power and will continue to do everything within its power to win this suit and to make the verdict of the people, as expressed at the polls in April of this year, operative.

"Furthermore, it will be necessary, before any franchises become finally binding, that they be voted by the people of Dallas at a regular election. The next regular election is the first Tuesday in April, 1917. Any franchises passed by the Board of Commissioners at this time would be subject to a referendum vote by the people. Such referendum could be demanded by 500 qualified voters of Dallas. There is no question whatever—and all parties who are interested in the settlement of this matter agree as to this—that any adjustment of these franchises now, other than as distinctly voted on in April, 1916, would be subjected to a referendum vote. Such vote could only be legally held in April, 1917.

"We would not be willing, under any circumstances, to submit the Strickland-Hobson plan to the people of Dallas, either for a 'straw vote' or at a regular election, until there has been reached a definite, written agreement with Messrs. Strickland and Hobson covering every detail of these franchises, and there would be exacted by us four bonds in the aggregate sum of \$1,000,000, conditioned that the agreements relative to the expenditure of \$2,000,000 within the city of Dallas within eighteen months should be faithfully carried out, and conditioned that the agreement to build the two interurbans should be carried out.

**Plan of One Day Off in Ten Turned Down.**—Employees of the Tri-City Railway Company, Davenport, Iowa, by a margin of five votes, have rejected a proposition to take one day off in every ten instead of every fifteen as is the present plan.

**Wages of Gorge Men Increased.**—The Niagara Gorge Railway, Niagara Falls, N. Y., has granted a voluntary increase in wages to some of its platform men who have been in the company's service for many years. Some of the increases to platform men are as much as 3 cents an hour. Other employees were granted increases up to \$10 a month.

**Aurora Line Negotiating New Labor Contract.**—Practically all the questions involved in the negotiations for a new working agreement between the Aurora, Elgin & Chicago Railroad, Aurora, Ill., and its employees are being settled in conference. It is understood, however, that the question of wages will be submitted to arbitration after the other difficulties are settled. The old labor contract expired June 1, 1916.

**Hearing on Change in Fiscal Year.**—The Interstate Commerce Commission has set Nov. 13 for a hearing in regard to the change of the end of the fiscal year for common carriers by rail from June 30 to Dec. 31, and it has invited all interested parties to be present. At the meeting of the executive committee of the American Electric Railway Accountants' Association, held in Chicago on Feb. 3, a resolution was adopted favoring this change, in accordance with the suggestion of the American Railway Accounting Officers.

**Political Posters Prohibited on Detroit Lines.**—Political candidates have been informed through a recent issue of *Electric Railway Service*, the company publication of the Detroit (Mich.) United Railway, that they will save con-

siderably in their printing bills if they will announce to their workers not to attempt to place cards, posters and the like on the property of the company. Instructions have been issued that political advertising matter must not be posted or distributed, and if posted unknown to officials of the company it will be torn down and destroyed as soon as discovered.

**Demands of Birmingham Men Being Considered.**—On Aug. 19 representatives of the newly organized employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., presented demands for a recognition of the union, a rearrangement of the present wage scale and a regulation of working hours. On Aug. 21 the announcement was made that the union had been recognized and that the whole incident was closed as far as public interest was concerned. It only remained to arrange the details of wages and hours.

**Partial Payment Stock Plan Grows in Public Favor.**—Sales of preferred stock of the Northern States Power Company to customers of that organization, made under the partial payment plan, are on the increase. During June and July stock at a par value of \$31,000 was sold to 135 customer investors. This would indicate that the popularity of the partial payment plan is steadily growing. A detailed description of the plan followed by this and other properties of H. M. Byllesby & Company, Chicago, Ill., in selling securities to patrons was published in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12.

**Higher Wage Scale for Philadelphia.**—The co-operative committee of the Philadelphia (Pa.) Rapid Transit Company at a meeting held on Aug. 23 in company with the management determined that the condition of the 22 per cent fund was such as to make possible an advance of 1 cent an hour to all of the conductors and motormen of the company. Effective on Sept. 1 the new hourly scale reads as follows: New men, 27 cents; after one year's service, 28 cents; after two years' service, 29 cents; after three years' service, 30 cents; after four years' service, 31 cents; after five years' service, 32 cents.

**No Cause for Trouble at Toledo.**—A committee of the Central Labor Union, Toledo, Ohio, reported to that body on Aug. 24 that, after making a thorough investigation, it had found no cause that would justify any radical action on the part of the union against the Toledo Railways & Light Company. The recent complaints, the report said, were made by four or five men. There may be some minor troubles, it continued, but these can all be handled in a satisfactory manner. A committee of the street car men will meet President Coates at an early date to consider some of these matters, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

**Harrisburg Strikers Secure Jitney Referendum.**—The striking trolley men of the Harrisburg (Pa.) Railways during the last week concentrated their energies on procuring signers for the referendum petition to repeal the present jitney ordinance and to pass a new one, cutting the bond from \$2,000 to \$1,000, and reducing the license fee from \$50 to \$10. That they were successful is shown in the fact that only 1751 signers were needed to compel action and 2800 names were on the referendum paper on Aug. 30. If the City Commission refuses to accept the provisions of the new jitney ordinance the people will be given the right to vote upon the ordinance at the November election.

**Seventy-five Thousand Dollars of Business Lost by Strike.**—Towns along the line of the Buffalo & Southern Railway, Buffalo, N. Y., assert that they have lost more than \$75,000 in business since the strike on the company's property, which has been in effect since last May. The line has been very seriously crippled by law-breaking strikers and their sympathizers. Nathan A. Bundy, receiver, is making an effort to operate a few cars between the Buffalo city line and Gardenville, Hamburg, Orchard Park and Ebenezer. New York bondholders have been asked to come to Buffalo and investigate the situation. Governor Whitman has also been requested to appoint a commission to investigate the trouble.

**Chattanooga Car Strike Ends.**—The strike of some conductors and motormen of the Chattanooga Railway & Light Company, which led to violence compelling a suspension of



night service during part of last week, was settled on Aug. 25 by the strikers agreeing to go back to work pending arbitration. The only points thus far granted by the company are the recognition of the union and the reinstatement of twenty-one discharged employees. While no difficulty is expected in reaching a final settlement, there are two items that may have to be put into the hands of arbitrators. These are the increase in wage scale and the closed-shop provision. Conferences are now being held, and if no agreement is reached arbitration will be used.

**Remedy for Internal Fissures in Rails Discovered.**—A. H. Smith, president New York Central Railroad, New York, N. Y., has announced that P. H. Dudley has discovered a positive cure for internal fissures in steel rails, a defect which has baffled engineers for a number of years. After experiments covering a considerable period of years, Mr. Dudley has concluded that such fissures are caused by imperfect processes of manufacture and not by excessive wheel loads. In order to eliminate these, new specifications governing the manufacturing process have been developed. In addition to the usual methods, these specifications require reheating of the finished product by a special method. In announcing this discovery President Smith stated that through the use of Mr. Dudley's specifications the actual breakage of rails in service has been reduced from one in 600 to one in 142,000.

**Gap Between Cleveland and Pittsburgh Closed.**—The last gap in the interurban lines connecting Cleveland, Ohio, and Pittsburgh, Pa., was closed on Aug. 24, when the Cleveland, Alliance & Mahoning Valley Railway opened service between Alliance and Warren, Ohio. A passenger may now make the trip by using the Northern Ohio Traction & Light line between Cleveland and Ravenna. At the latter place he would take a Cleveland, Alliance & Mahoning Valley Railway car for Warren, where he would change to the line of the Republic Railway & Light Company to reach Youngstown. Youngstown, New Castle and Pittsburgh are connected by interurban lines and the trip could be thus completed. Some years ago there was much talk of through service between Cleveland and Pittsburgh, but a small gap existed in the line that was never closed. The new line provides a different route from the one originally considered.

**New Franchise Ordinance Passed in Henderson.**—Henderson, Ky., has passed an ordinance providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical, and the Evansville company has stated that it does not plan to bid for the privilege of operating under it. Some of the features of the new measure are: Half-fares for school children while on their way to and from school; 3-cent fares for all passengers between 6 a. m. and 7 a. m. and between 6 p. m. and 7 p. m.; a fifteen-minute schedule for the first five years and a ten-minute schedule for the remaining fifteen years of the life of the franchise; four years for making all necessary repairs and overhauling the present tracks in the event the franchise is purchased by the present operator, and the changing of the present routing in some respect.

**Wage Increase Asked in Louisville.**—The Louisville (Ky.) Railway has been waited on by a committee of employees, who asked that an increase in the scale of wages be considered by the company. The conference with President T. J. Minary was friendly. The employees said they realized that the company's earnings had fallen off in late years, but the cost of living had gone up and they urged that the matter of an increase be taken up if possible. As soon as the members of the executive committee return to the city, Mr. Minary said, the subject will be considered. The men are now being paid from 21 to 24 cents an hour. A woman stockholder wrote to one of the Louisville newspapers in regard to the proposal, asserting that the holders of common stock, many of whom depend on it for a living, should be given first consideration. The common stock, she said, is paying 4 per cent, no increase having been granted in years, while the men have been advanced several times of late. She added that if the street-car men are not satisfied the company should employ women, many of whom could be found to operate the lines.

## Financial and Corporate

### TRACTION COLLATERAL FOR BRITISH LOAN

The list of American securities which are to serve as part of the collateral for the loan of \$250,000,000 to the British government has been made public by J. P. Morgan & Company. The total number of American securities, which are valued at \$100,000,000, is 503, including 442 bonds and sixty-one stocks. The stocks are made up of thirty-six steam-railroad issues, five public-utility issues (including the Manhattan Railway), and twenty industrial issues. The bonds include 320 steam-railroad issues, ninety public-utility issues, and thirty-two miscellaneous issues, including industrial, municipal and other bonds. The ninety public-utility bond issues comprise forty-one electric railways and forty-nine other utilities. Included in the electric-railway list are the following issues:

American Power & Light 10-yr. 6s, 1921.	Manhattan Ry. cons. 4s, 1990.
Brooklyn Rapid Transit secured 5 per cent notes, 1918.	Michigan United Rys. 1st ref. 5s, 1936, Series A.
1st & ref. M. 4s, 2002.	1st ref. 5s, 1936, Series B.
5s, 1945.	New York Rys. 1st real estate ref. 4s, 1942.
B'way & 7th Av. RR. 1st cons. M. 5s, 1943.	New York, Westchester & Boston Ry. 1st M. 4½s, 1946.
Chicago Railways 1st M. 5s, 1927.	Northwestern Elevated Ry. 1st 5s, 1949.
Commonwealth Power, Ry. & Lt. conv. 6s, 1918.	New York State Rys. 1st cons. 4½s, 1952, Series A.
Detroit United Rys. 1st cons. 4½s, 1932.	Portland Ry., Light & Power 1st ref. 5s, 1942, Series A.
Duluth Street Ry. 1st M. 5s, 1930.	Portland Ry. 1st & ref. a. f. 5s, 1930.
Eastern Power & Light Corp. conv. 5s, 1918.	Public Service Corp. of N. J. gen. M. 5s, 1959.
Federal Light & Traction 1st lien a. f. 5s, 1942.	Puget Sound Traction, Light & Power 6s, 1919.
Georgia Light, Power & Rys. 1st lien 5s, 1941.	Rochester Railway M. 5s, 1930.
Georgia Ry. & Elec. 1st cons. 5s, 1932.	St. Louis, Springfield & Peoria RR. 1st and ref. 5s, 1939.
Interborough-Metropolitan coll. tr. 4½s, 1956.	San Joaquin Light & Power Corp. 1st and ref. 6s, 1950.
Interborough Rapid Transit 1st 5s, 1966.	Springfield Ry. & Light 1st lien a. f. 5s, 1926.
Kentucky Traction & Term. 1st & ref. 5s, 1951.	Third Avenue RR, 1st M. 5s, 1937.
Louisville Ry. 1st cons. 5s, 1930.	Tri-City Railway & Light coll. tr. 1st lien 5s, 1923.
Lynn & Boston Ry. 1st M. 5s, 1924.	1st ref. 5s, 1930.
Newport News & Hampton Ry., Gas & Electric 1st & ref. 5s, 1944.	United Light & Railways 1st & ref. 5s, 1932.
New Orleans Ry. & Light gen. 4½s, 1935.	Virginia Ry. & Power 1st & ref. 5s, 1934.
	Washington Ry. & El. cons. 4s, 1951.

### IDAHO CONSOLIDATION REPORTED

It is reported that the hydroelectric and steam-generating properties in southern and western Idaho, with their transmission and distributing systems and some allied electric railways which were financed about a year ago through the Northern Securities Corporation, have been consolidated under the name of the Idaho Power Company, with a capitalization of \$17,000,000. The Electric Investment Corporation, which was organized to assist in the consolidation, will be dissolved. The Boise Valley Traction Company, organized to take over the electric railway lines, will remain in existence, but all its stock will be held by the new company.

The new company is organized under the laws of Maine, but twelve of its sixteen directors are residents of Idaho. Companies merged into the Idaho Power Company include the Idaho-Oregon Light & Power Company, the Idaho Railway, Light & Power Company, the Idaho Power & Light Company, the Great Shoshone & Twin Falls Water Power Company, the Southern Idaho Water Power Company, the Jerome Water Works Company, together with a number of properties controlled by these corporations. The new company will operate in every city and town in the great Snake River Valley, with the exception of the two supplied with government power.

F. F. Johnson, Boise, is president, and William T. Wallace, vice-president and general manager. George E. Clafin and D. F. McGee, New York, are also vice-presidents, with E. P. Summerson and A. E. Smith of the Electric Bond & Share Company assistant secretaries and assistant treasurers. G. M. Dahl, of the Electric Bond & Share organization, is a director and member of the executive committee.



## ANNUAL REPORTS

## International Traction Company

The comparative income statement of the International Traction Company System, Buffalo, N. Y., for the years ended Dec. 31, 1914 and 1915, follows:

	1915		1914	
	Amount	Per Cent	Amount	Per Cent
Gross passenger earnings....	\$6,564,631	95.9	\$6,492,212	96.0
Receipts from other sources..	275,343	4.1	268,368	4.0
Total .....	\$6,839,974	100.0	\$6,760,580	100.0
Operating expenses .....	\$3,480,543	50.9	\$3,601,800	53.2
Taxes .....	425,484	6.2	423,632	6.3
Total .....	\$3,906,027	57.1	\$4,025,432	59.5
Net earnings from operation..	\$2,933,947	42.9	\$2,735,148	40.5
Interest .....	\$1,681,468	24.6	\$1,645,400	24.3
Rentals .....	47,971	0.7	45,379	0.7
Sinking fund and amortization of debt, discount and expense	137,521	2.0	132,601	1.9
Total fixed charge.....	\$1,866,960	27.3	\$1,823,380	26.9
Balance for renewals, replacements and dividends.....	\$1,066,986	15.6	\$911,767	13.6
Renewals and replacements reserve .....	396,582	5.8	359,244	5.4
Surplus .....	\$670,404	9.8	\$552,523	8.2

The gross earnings of the system for 1915 showed an increase of \$79,393 or 1.2 per cent as compared to 1914, while the operating expenses and taxes decreased \$119,404 or 2.9 per cent, so that the net earnings from operation gained \$198,798 or 7.2 per cent. All of the saving in expenses came in the operating group, taxes showing a slight increase. A considerable portion of the saving in operating expenses was caused by the modification of the contract under which the company receives electrical energy and which will be a continuing source of economy in operation.

The fixed charges for 1915 showed an increase of \$43,579 or 2.4 per cent over those of the preceding year, this arising from interest accrued on additional bonds issued for improvements and the acquisition of additional property and also from higher rental and amortization charges. The balance remaining for renewals, replacements and dividends was \$155,218 or 17.0 per cent greater than in 1914, while the amount set aside for the renewal and replacement reserve increased \$37,338 or 10.4 per cent.

The lines of the system were not subjected to jitney competition during the last year, for only one jitney appeared in Buffalo. State and municipal authorities passed regulatory legislation which is a safeguard for the future against irresponsible competition from this source. The first two months' operation in 1916 showed a marked increase in gross receipts and the management looks forward to a prosperous year.

## Lethbridge Municipal Railway

The commissioners' and auditors' reports of the City of Lethbridge, Alta., for the calendar year, 1915, contain the following data regarding the operations of the Lethbridge Municipal Railway during 1914 and 1915:

	1915	1914
Expenditures .....	\$71,582	\$83,255
Revenue .....	41,740	46,053
Deficit .....	\$29,841	\$37,202
Gross receipts .....	\$41,020	\$45,333
Operating expenses .....	38,199	48,810
Operating ratio (per cent).....	93	108
Net earnings (exclusive of interest, sinking fund, insurance and taxes).....	\$2,821	.....
Net loss (exclusive of interest, sinking fund, insurance and taxes).....	.....	\$3,477
Passengers carried .....	844,307	1,054,848
Average daily receipts .....	\$112	\$124
Transfers .....	49,938	184,481
Car miles .....	294,164	357,938
Revenue per car mile (cents).....	14.19	12.87
Total cost per car mile (cents).....	24.33	23.26
Passengers per car mile.....	2.87	2.95
Average fare per passenger (cents).....	4.77	4.22

The auditors state in their report that the result of the operation of the street railway for 1915 was a net deficit revenue of \$29,841, which was provided for, as in recent years, by taxation. In spite of a diminished revenue this result is said to be a considerable improvement over that in

1914. This is largely attributable to reduced operating charges resulting from the change to the one-man system of cars put into effect in the latter part of that year. It was found necessary during the year, owing to the increased cost of electrical power, to increase the charges to this department for that service from 2 to 2.75 cents per kilowatt-hour, which meant an added charge of \$4,054 for power.

## Philadelphia &amp; Western Railway

The gross revenues of the Philadelphia & Western Railway, Upper Darby, Pa., for the year ended June 30, 1916, totaled \$491,488, an increase of \$68,681 over those of the preceding year. Most of this increase came in passenger revenues, which gained \$60,491, although freight revenues in rising \$879 to a total of \$1,882 showed a high percentage gain. The operating expenses at \$234,818 showed an increase of \$24,778, this increase being well distributed among the various operating groups. The operating ratio decreased 1.9 per cent during the year to 47.78 per cent. The maintenance items aggregated 18.5 per cent of the gross revenues and 40 per cent of the operating expenses. The operating income of \$256,669 for the year showed a gain of \$43,902. Taxes increased \$8,700 to a total of \$18,000, but other deductions from income decreased so that the net income for the year, amounting to \$106,319, showed an increase of \$40,893. During the year the company carried 3,370,468 passengers, an increase of 438,775, and ran 1,376,691 car miles, an increase of 100,984. The earnings per passenger car mile amounted to 33.5 cents, an increase of 2.1 cents, and the expenses per revenue car mile were 16.75 cents, an increase of 0.55 cent. There was expended for additions and betterments during the year \$14,432.

## Glasgow Corporation Tramways

The working of the Glasgow Corporation Tramways for the year ended May 31, 1916, resulted in an ordinary income of £1,157,336. The working expenses, including payments to dependents of employees at war, totaled £773,442, leaving a net revenue of £383,894. The ordinary income of the preceding year was £1,076,877 and the working expenses £735,897, the net revenue of £340,890 for the last fiscal year thus showing a substantial improvement over the preceding. After adding interest on investments the income of £465,097 was applied to the payment of interest, sinking funds, income tax, parliamentary expenses and depreciation, the total amount so used being £421,549. The net income of £43,548 was paid over to the common good.

The gross revenue for the last fiscal year showed an increase of £95,834, and the average traffic revenue per car mile increased from 10.61d. to 11.049d. The working expenses, excluding expenditures incurred on account of the war, showed an increase of £8,833. The allowances paid to dependents engaged at the front was £68,550 for the year. During the year £62,175 was expended on the upkeep of the tramway track in ordinary repairs. In addition to this, £68,681 was set aside out of the year's revenue to meet the cost covering renewals of track, this sum being calculated at the rate of £350 per mile of single track. The total cost of ordinary repairs to the power plant and sundry machinery during the year was £6,678, and £23,045 was charged against revenue to cover depreciation.

During the last fiscal year, with 650.65 cars in average use on a fourteen-hour day as compared to 628.20 in the preceding year, the car mileage amounted to 24,063,309 car miles as compared to 24,214,460 car miles in 1915. The passenger traffic increased from 336,260,758 in the preceding year to 363,371,464 in the last fiscal year, and the receipts from £1,070,694 to £1,149,264, so that the average traffic revenue per car mile showed a gain from 10.61d. to 11.05d. The percentage of the working expenses to traffic receipts in the last fiscal year was 60.3 per cent as compared to 63.9 per cent in the preceding year. The average total revenue per car mile was 11.127d. in 1916 and 10.674d. in 1915, and the average fare paid per passenger was 0.761d. and 0.764d. respectively. The number of passengers per car mile increased from 13.887 in 1915 to 14.516 in 1916, while the number of passengers per mile of single track rose from 1,697,243 to 1,827,757. The amount expended on capital account during the last fiscal year was £83,448.



## NORTHERN OHIO CONTROL SOLD

## 1000 Shareholders to Profit Through Sale of Stock at Par to Eastern Interests

E. W. Moore, vice-president Northern Ohio Traction & Light Company, Akron, Ohio, announced on Aug. 25 that his own interests and those of Henry A. Everett had been sold to E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, contingent upon their obtaining 95 per cent of the common stock now outstanding. These men own more than 30 per cent of this stock. In all there are about 1000 stockholders, and their average holdings are ninety shares each. The agreement is that the price shall be par, or \$100 per share. Following is the statement issued by Mr. Moore at that time:

"A contract has been entered into between the holders of the Northern Ohio Traction & Light Company common stock aggregating a majority for the sale of the stock with the understanding that all holders of common stock may participate on exactly the same price and terms. The price is par, and the dividends payable on Sept. 15 will go to present holders. The sale is contingent upon 95 per cent of all the stock coming in.

"Notices are being mailed to-day requesting deposit of the stock with the Citizens' Savings & Trust Company as trustee. The bank will issue participating certificates. The terms are \$3 a share, to be paid on notice by the trustee that 95 per cent of the stock is on deposit; \$47 a share payable thirty days later, and the remaining \$50 a share to be paid on or before one year later at 6 per cent interest payable quarterly. The trust company certificates will have all of the stock so purchased as security. They will be in negotiable form and usable in place of the stock. Possession of the property will not be turned over to the buyers until a full 50 per cent has been paid."

The buyers have expressed the intention of carrying out all the betterments and extensions that have been planned by the present owners. The \$4,000,000 of forty-year 5 per cent bonds recently sold to N. W. Halsey & Company will be distributed by the National City Bank of New York. While the plans of the buyers, outside of the extensions and betterments, have not been made known, it is believed that there will be no material change in the management. As yet no announcement has been made as to whether or not the purchased company will become a subsidiary of the Commonwealth Power, Railway & Light Company, but this is quite possible.

**Lancaster & Southern Street Railway, Millersville, Pa.**—Henry A. Hitner's Sons Co., Philadelphia, Pa., which recently purchased at public auction the property of the Lancaster & Southern Street Railway, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26, states that plans are on foot for the reorganization of the railway.

**Lincoln Railway & Heating Company, Lincoln, Ill.**—The Lincoln Water & Light Company has taken a sixty-day option on the property of the Lincoln Railway & Heating Company, with the result that the former may provide a continuance of street-car service if certain franchise stipulations are granted by the city. A part of this plan is that the Chautauqua extension, heretofore operated as a separate property, be consolidated with the Lincoln Railway & Heating Company, and that adequate service, with a 5 instead of a 10-cent fare, be made to and from the Chautauqua grounds. It is said that the owners of the Chautauqua extension are willing to donate their line if first-class service be granted to the assembly grounds. It will be remembered that the Illinois Public Utilities Commission gave the Lincoln Railway & Heating Company the right to discontinue business provided the City Council of Lincoln would concur in the suspension of street-railway service. It is believed that the new plan will provide for uninterrupted service.

**New York (N. Y.) Railways.**—The interest on the New York Railways 5 per cent adjustment bonds for the six months ended June 30, as declared by the directors, is \$19.81 per \$1,000 bond, as compared to \$13.70 for the corresponding period of last year. Judge A. N. Hand in the United States District Court on Aug. 25 filed an order granting the petition of the Farmers' Loan & Trust Company in the old Metropolitan Street Railway litigation and

directing that the offer of the New York Railways providing for the settlement of a distributive rate of \$350 for each of 121 refunding bonds with two coupons attached, dated April 1 and Oct. 1, 1908, amounting to \$42,350 less \$5,309 for compensation of the trustee and various disbursements, shall be accepted. It is provided in the order that \$16,483,000 of the refunding bonds in the possession of the New York Railways shall be submitted to the Farmers' Loan & Trust Company and stamped as paid.

**Ohio Traction Company, Cincinnati, Ohio.**—The \$200,000 of 6 per cent notes of the Ohio Traction Company due on Sept. 1 will be paid off at maturity at the office of the Pennsylvania Company for Insurances on Lives & Granting Annuities, Philadelphia, Pa.

**Toledo Traction, Light & Power Company, Toledo, Ohio.**—Henry L. Doherty & Company has announced that the executive committee of the Cities Service Company will recommend to the board of directors that the privilege of depositing Toledo Traction, Light & Power Company stocks for exchange for Cities Service Company securities, which expires on Sept. 1, be extended until Sept. 15.

## DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1½ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

## ELECTRIC RAILWAY MONTHLY EARNINGS

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.						
Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income	
1m., June, '16	\$24,656	\$15,862	\$10,794	\$5,266	\$5,528	
1 " " '15	24,589	14,071	10,518	5,561	4,957	
12 " " '16	304,420	169,739	134,681	65,606	69,075	
12 " " '15	265,298	168,278	97,020	67,041	29,979	
JACKSONVILLE (FLA.) TRACTION COMPANY						
1m., June, '16	\$50,081	\$33,705	\$16,376	\$15,419	\$957	
1 " " '15	50,516	35,921	14,595	14,593	2	
12 " " '16	615,181	420,015	195,166	179,273	15,893	
12 " " '15	645,282	447,568	197,714	166,043	31,671	
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.						
1m., June, '16	\$72,030	\$43,039	\$28,991	\$16,094	\$12,897	
1 " " '15	67,446	40,379	27,067	16,011	11,056	
12 " " '16	763,749	502,356	261,393	192,253	69,140	
12 " " '15	703,897	459,876	244,021	187,543	56,473	
NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.						
1m., June, '16	\$149,460	\$97,610	\$51,850	\$28,692	\$23,158	
1 " " '15	134,483	89,537	44,946	27,588	17,358	
12 " " '16	1,831,954	1,117,769	714,185	339,682	374,503	
12 " " '15	1,819,725	1,057,471	762,254	324,459	437,795	
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.						
1m., June, '16	\$24,201	\$22,917	\$1,284	\$7,132	†\$5,848	
1 " " '15	21,769	13,835	7,934	7,500	434	
12 " " '16	301,486	191,154	110,332	88,440	21,892	
12 " " '15	292,512	186,459	106,053	91,775	14,278	
PENSACOLA (FLA.) ELECTRIC COMPANY						
1m., June, '16	\$24,320	\$13,407	\$10,913	\$7,712	\$3,201	
1 " " '15	21,510	11,745	9,765	7,136	2,629	
12 " " '16	277,248	153,976	123,272	88,722	34,550	
12 " " '15	248,544	153,340	95,204	86,988	8,216	
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.						
1m., July, '16	\$2,214,928	\$1,221,475	\$993,453	\$815,267	\$178,186	
1 " " '15	1,939,905	1,095,694	844,211	816,596	27,615	
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1m., July, '16	\$326,707	\$196,867	\$129,840	\$72,305	\$57,535	
1 " " '15	250,907	143,990	106,917	57,620	49,297	
7 " " '16	2,260,626	1,340,305	920,321	493,394	426,927	
7 " " '15	1,707,826	1,060,293	647,533	389,923	257,610	
SAVANNAH (GA.) ELECTRIC COMPANY						
1m., June, '16	\$63,110	\$46,860	\$21,250	\$23,368	†\$2,118	
1 " " '15	63,749	41,847	21,902	22,971	1,069	
12 " " '16	789,536	531,538	257,999	279,644	†21,669	
12 " " '15	813,074	526,557	286,517	277,344	†9,173	
TAMPA (FLA.) ELECTRIC COMPANY						
1m., June, '16	\$73,379	\$42,418	\$30,961	\$4,396	\$26,565	
1 " " '15	77,003	41,898	35,105	4,378	30,727	
12 " " '16	975,227	519,656	455,571	52,255	403,316	
12 " " '15	986,799	507,367	479,432	52,836	426,596	
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., July, '16	\$880,859	\$520,157	\$360,702	\$145,046	\$215,656	
1 " " '15	793,496	497,120	296,376	144,650	151,726	
7 " " '16	5,890,274	3,662,780	2,227,494	998,433	1,229,061	
7 " " '15	5,398,033	3,532,136	1,865,897	986,133	879,764	

\*Includes taxes. †Deficit. ‡Includes non-operating income.



## Traffic and Transportation

### TENTATIVE STANDARDS FOR WASHINGTON

Public Utilities Commission of District of Columbia Will Consider Adoption on Sept. 6

The Public Utilities Commission of the District of Columbia has issued tentative regulations regarding standards of electric railway service in the district, with the announcement that the formal public hearing for the purpose of considering their adoption will be resumed on Sept. 6. The tentative provisions are as follows:

"Non-rush traffic is hereby defined as that existing from 9:15 a. m. to 3:45 p. m. and from 6:30 p. m. to 10:45 p. m. on mid-week days, and from 9:15 a. m. to 12 noon, and from 6:30 p. m. to 10:45 p. m. on Saturdays. Rush traffic is hereby defined as that existing from 6:30 a. m. to 9:15 a. m. on mid-week days and Saturdays, and from 3:45 p. m. to 6:30 p. m. on mid-week days. Mid-week days are hereby defined as Monday to Friday, inclusive, legal holidays excepted.

"The standard for non-rush traffic shall be on the average 100 seats per eighty passengers carried during a period of one hour, the hour period to be measured commencing on the hour and on the quarter hour points of the hour. The standard for rush traffic shall be on the average 7 sq. ft. of available standing floor area per passenger carried above the number for which seats are furnished during a period of one-half hour, the half hour period to be measured commencing on the hour and on the quarter hour points of the hour. (Accompanying tables indicate the seating capacity and the available standing floor area of the passenger cars now being operated in the District of Columbia.)

"The following traffic is specifically excepted from the application of the standards set: Traffic during all periods of week days not included above and all traffic during Sundays and legal holidays. During these periods and days excepted, the commission will require reasonably adequate and satisfactory service.

"Street railways shall operate all passenger cars in the District of Columbia in accordance with schedules on file with the commission. This shall not be construed to prevent additional cars from being placed in service for special demands. Schedules shall be filed with the commission not later than the date on which they are to become effective. However, schedules reducing any service during periods of week days not included above and on Sundays shall not be filed unless accompanied by the results of observations made on two consecutive days of similar character and covering the same period of days as covered by the reduction in service, and shall not become effective until approved in writing by the commission.

"Observations to determine whether service rendered complies with the standards shall be made only at specified observation points. A compliance observation at any of these observation points shall be the average of the results of observations made on three consecutive days (omitting periods and days specifically exempted from these standards), during identical hour periods, in the case of non-rush traffic, and during identical half-hour periods, in the case of rush traffic.

"Each street railway operating in the District of Columbia shall make compliance observations as provided in the preceding section at observation points, during periods, and in directions specified, once during January, once during April, once during July and once during October of each year, and shall submit the results to the commission on prescribed forms not later than the tenth day of the month following.

"In addition to these periodic compliance observations required, each street railway shall make such observations as will keep it in touch with the demand for service in the District of Columbia and also shall make and submit results of such observations as the commission may direct in writing from time to time. The Bureau of Transit and Equip-

ment Inspection will make such observations from time to time as may be advisable.

"When it comes to the knowledge of the commission through compliance observations made either by a street railway or by the Bureau of Transit and Equipment Inspection that the service furnished at certain observation points is below the standards, the commission may serve on the street railways involved a non-compliance notice, submitting a copy of the results of such observations. Within seven days after the receipt of such notice, the street railway shall file with the commission a schedule which provides for service complying with the standards when compared with the results of the observations submitted, which schedule shall then become effective immediately.

"If, in case a non-compliance notice is based on the commission's observations, the street railway submits, within the seven-day period noted, compliance observations differing materially, in the opinion of the commission, from the commission's observations, joint observations shall be made by representatives of the commission and the street railway and the results of such joint observations shall then be substituted for those determined by the previous observations in question. If such joint observations are authorized by the commission such authorization shall act as a stay of the non-compliance notice so far as it refers to the period and line in question.

"The commission recognizes the fact that frequency of service is also an element of reasonably satisfactory service. The commission may, therefore, require a change in any schedule in which the frequency of service is found to be not reasonably satisfactory."

### SAN FRANCISCO JITNEY ORDINANCE UPHELD

Court Refuses Permanent Injunction Against Market Street Operation—Test Case Fails

Superior Judge Crothers, in a decision rendered on Aug. 23, upheld the validity of the ordinance barring jitney buses from Market Street, San Francisco, from Sixth to Fremont, between the hours of 10:30 a. m. and 4 p. m. This ordinance was noted in the *ELECTRIC RAILWAY JOURNAL* of July 29 and Aug. 12.

Judge Crothers' decision dissolved the temporary injunction previously issued restraining police regulation, and refused a permanent injunction. It was based primarily upon two grounds, the first being that the Supreme Court of California recently held in the case of *Sullivan vs. the San Francisco Gas & Electric Company* (148 Cal. 368) that "an injunction should not be issued to enjoin the enforcement of an invalid law where the enforcement does not deprive the plaintiff of property rights, but merely interferes with plaintiff's business." The other reason for the decision was cited as follows: "The right of the governing body (Board of Supervisors) to enact legislation for the reasonable regulation of traffic on city streets is not open to question, and is not questioned by the authorities cited by counsel for plaintiffs. The right of the city to regulate and control the jitney bus traffic has been presented to the highest courts in many states, and although the statutes and ordinances involved have provided almost every conceivable form of restriction, they have in every instance been held to be valid and enforceable." Judge Crothers added: "The right of the legislative body to regulate jitney bus traffic upon the public streets is a matter which, under the decisions cited above, rests in the judgment and discretion of that body, and the courts have no authority to interfere unless it is conclusively apparent that the restriction is purely arbitrary and not in the interest of traffic along or across the street, or for some other reasonable, lawful purpose."

The ordinance went into immediate effect, and on Aug. 24, to provide a test case, a member of the Jitney Bus Operators' Union violated the law and was arrested. On Aug. 25, counsel for the union made application for a writ of habeas corpus from Judge Cabaniss of the superior court, the application being based on the contention that the permit to operate is a franchise and that a franchise under the charter does not become effective until sixty days after it is granted. This application was denied by Judge Cabaniss without argument from the prosecution. The petition was:



then taken to the Supreme Court, where Judges Angellotti, Sloss, Lawlor and Melvin, sitting in consultation, denied the writ without rendering an opinion. This establishes the legality of the ordinance.

### WHO USES THE STREETS?

**Seattle Check Shows Passenger Automobiles Are 67 per Cent of Traffic—Street Cars Only 14 per Cent**

Recently the City Superintendent of Public Utilities of Seattle, Wash., ordered a check of traffic on Second Avenue. The check was made from 7 a. m. to 7 p. m., and consisted of a count of all vehicles passing a point between University and Union Streets. The results of the count, as announced in the Aug. 24 issue of *The Electrogram*, the company publication of the Puget Sound Traction, Light & Power Company, follow:

	Northbound	Southbound	Total
Passenger autos .....	2,494	2,698	5,192
Commercial autos, trucks, etc. ....	562	460	1,022
Teams .....	249	210	459
Street cars .....	539	532	1,071
Total for all vehicles.....	3,844	3,900	7,744

This information gives a good idea of who uses the streets and to what extent. Passenger automobiles, including private machines, taxicabs and jitneys, far outnumber all other vehicles put together. They total 67 per cent of the traffic. Street cars represent about 14 per cent of the traffic. Auto trucks and delivery wagons comprise 13 per cent. Teams represent about 6 per cent. These figures for Second Avenue are said to be probably a reasonable basis for estimating the proportions of street use in other portions of the city. In any event, they represent the downtown traffic.

Of all this traffic, the street cars, comprising but 14 per cent of the whole, are the only street users which pay special taxes for the use of the streets. The street cars pay for paving that portion of the streets between their tracks and a strip on each side. No other form of traffic pays for any portion of the paving.

The street car company pays one-half of the salary of the city's traffic officers at busy corners. Yet only 14 per cent of the traffic which these men regulate is street car traffic, and the other 86 per cent pays no part of the officers' salaries. A large portion of the automobile traffic, which forms 67 per cent of the street users, is jitney bus traffic. These users of the streets pay no portion of paving cost, no portion of traffic officers' salaries. They make free use of the streets for profit.

### SACRAMENTO JITNEYS HARD HIT

With the possible exception of a few cars, Sacramento, Cal., is without a jitney service, all operators having withdrawn on Aug. 12, when Superior Judge Malcolm C. Glenn dissolved the injunction against the city ordinance regulating the operation of jitneys. Immediately upon the dissolution of the injunction, which had been in effect since July 21, 1915, 170 members of the Jitney Association declared that they would withdraw their cars from the streets. About eighteen private operators also expressed their decision to cease work rather than to take a chance of running afoul of the new ordinance.

The present jitney ordinance, which provides for an annual license of \$40, a bond of \$10,000, a fixed route and a fare not higher than 5 cents, was adopted last year by the City Commission. Before it went into effect the Jitney Association, through its secretary, A. P. Michaelson, asked that an injunction be issued. Judge Glenn issued the injunction and City Attorney Yell immediately appealed to the Supreme Court. This court just recently handed down an opinion which opened the way for Mr. Yell to ask for the dissolution of the injunction.

The jitney operators, however, have not given up the fight. Unless the City Commission agrees to make certain modifications in the new jitney ordinance, the Jitney Association has decided to invoke the initiative and submit a new ordinance to the people of Sacramento.

The *Sacramento Star* has made the following editorial comment on the situation:

"A greater burden is now upon the street railway company. The people have become accustomed to handy service

and rapid transit. If the street railway can, in a large measure, meet the public demand the jitney soon will be forgotten.

"If the jitney men wish to come back they must form a reliable association and be ready to submit to regulation. That the drastic ordinance now in effect can be modified is generally believed. But the jitney men have lost an opportunity and it is unlikely they will regain the prestige they once had.

"So we must fall back on the street railway and ask its officers to meet the public demand. The company has shown a fine spirit in the last year. If this is maintained we predict good relations between the corporation and the people."

### MUTUAL INSURANCE FOR JITNEYS

**New Orleans Operators Complete Arrangements for the Formation of Bonding and Insurance Company**

Jitney interests in New Orleans, La., have completed plans for the formation of the Automobile Mutual Liability Indemnity Association, a mutual society to insure against loss or damage any automobile engaged in the jitney business and to protect members from loss by legal liability or damage to property resulting from a collision in which a jitney automobile figures.

Operation of the proposed corporation is to begin as soon as \$25,000 of premiums has been paid in. A sum in excess of \$25,000 already has been subscribed by members of the association, and, allowing for some subscriptions which may not materialize, organizers of the mutual indemnity society are confident that the \$25,000 required by the State law will be on deposit in a New Orleans bank in a short time.

It is said that assurances have been received from the city authorities that bonds given by such an organization as the one proposed will be accepted from jitney owners. The bond required for operation of a jitney under the city ordinance is \$5,000.

The terms of members will be three years, with the privilege of renewal. Any member may be expelled for cause on five days' notice, and in such case the unexpired proportion of assessments for the year will be returned. In case of any claim against the company in excess of the surplus fund, extra assessments will be made against members. Each member will possess one vote without regard for the amount of stock in the company he has subscribed for.

Raising the \$25,000 capital necessary to incorporate the association has involved the mortgaging of many cars that will be used as jitneys. Members of the jitney association not only pledged as large sums in cash as each felt he could afford, but in addition all will offer mortgages to make up the securities needed. Of the \$25,000 required only \$10,000 must be cash. The rest may be negotiable paper.

**Kansas City Adopts Loading Signs.**—The Kansas City (Mo.) Railways has arranged for painting arrows on the pavement at loading points at downtown intersections, to show the exact spot at which passengers may board.

**Atlantic City Regulates Jitneys.**—Atlantic City on Aug. 24 assumed complete supervision over jitney buses. The ordinance regulating their use outlines routes and fares and other matters. Violations of the ordinance are punishable by fines up to \$100 or imprisonment for ninety days. The route along the principal thoroughfares covers about 3 miles, and automobiles must continue to the end. Five-cent fares are to prevail, except that 10 cents may be charged from midnight until 5 a. m.

**New Bathing Beaches Help Railway Traffic.**—The construction of municipal bathing beaches along the shore of Lake Erie near the Buffalo, N. Y., city line has greatly increased Saturday and Sunday traffic over the line of the Buffalo & Lake Erie Traction Company between Buffalo and near-by towns on the lake shore. Estimates by company officials place the total number in bathing on Sundays at more than 75,000, a large percentage of whom use the company's lines to reach the municipal beaches. All available cars have been pressed into service, and the company has leased a number of interurban cars from the International Railway to use during the rush hours.



**Jitney Overloading Prohibited in El Paso.**—The City Council of El Paso, Tex., has passed an ordinance prohibiting overloading of automobiles used in the jitney service here. During the street-car strike the jitneys were inclined to haul as many people as could find room in the cars, and this condition led to the drastic law that has been passed. Under the new law jitney drivers are allowed to carry only the regular carrying capacity of their cars; that is, a five-passenger automobile is allowed to haul but four passengers. Sitting on the doors or standing in the cars or on the running boards is prohibited. Jitney men assert that the law will put them out of business.

**Proposed Franchise for Portland Jitneys.**—Commissioner Daly of the department of public utilities has completed his revision of the proposed franchise for the operation of jitneys over what is known as the Hawthorne Avenue route sought by the Union Motor Bus Company, and will present it to the Council for consideration at the next meeting. This franchise when approved by the Council will serve as a model for other franchises for the operation of jitneys. The franchise provides for a five-minute headway between 7.30 a. m. and midnight on week-days and a fifteen-minute headway between 9 a. m. and midnight on Sundays, a license fee of \$6 a quarter, a 5-cent fare and a monthly inspection of machines.

**State Official Praises Louisville Safety Work.**—Those in charge of the safety work of the Louisville (Ky.) Railway were highly pleased with the compliment paid the work by Robert T. Caldwell, chairman of the State workmen's compensation board, which recently began work. Mr. Caldwell, in a recent address before the Louisville Rotary Club, emphasized the accident-prevention phases of compensation systems, and said that the co-operation of manufacturers would go a long way in the direction of preventing injuries to their workmen. In this connection he used as an illustration the efforts of the Louisville Railway and its men in co-operating with the public to reduce accidents, and said that the work accomplished by the company was marvelous.

**Seattle Council to Consider Jitney Regulation.**—Initial steps for the regulation of jitney buses in Seattle were taken by the City Council recently when a committee of three members was appointed by President A. F. Haas to submit a report and such ordinances as it deemed necessary. The committee was named after the Council had gone into session as a committee of a whole to discuss the report submitted by the assembly of improvement and civic clubs, prepared by A. V. Bouillon, Edgar J. Wright, J. A. Paine and other club representatives. A letter from the Puget Sound Traction, Light & Power Company asking the Council to take some steps to regulate jitney competition was submitted by A. L. Kempster, manager of the company. Accompanying the communication was a huge stack of printed petitions containing 41,751 signatures. An affidavit certifying to that number was made by Mr. Kempster's chief clerk. These petitions were mentioned in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

**Official Report on South Cambria Accident.**—John P. Dohoney, investigator of accidents of the Public Service Commission of Pennsylvania, on Aug. 26 presented to the commission a comprehensive report on the head-on collision which occurred on the Southern Cambria Railway on Aug. 12, in which twenty-six people were killed and a score injured. According to Mr. Dohoney, the death of the two motormen prevented the obtaining of more definite information as to the causes of the disaster, but it seemed that the air brakes failed and the hand brakes were broken in trying to stop one of the cars. The investigation made, it was said, had developed the fact that the daily mechanical inspection of the cars was not thorough. Mr. Dohoney therefore recommended that the commission instruct the company to see that the brakes were inspected daily and also frequently tested during the day. Chairman Ainey of the commission stated that the commission would direct the bureau of engineering to make a careful examination of the tracks, grades, safety devices, etc., in use and the condition of the cars and property of the company with a view to determining what further orders or recommendations should be made to provide maximum safety.

## Personal Mention

George A. Smith has been appointed assistant general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa.

C. N. Stannard, secretary of the Denver Gas & Electric Light Company, Denver, Col., was recently appointed to the committee on traction matters of the Denver Civic Association.

J. W. Atkins has recently been made engineer of power station of the Savannah (Ga.) Electric Company, being transferred to Savannah from the Blackstone Valley Gas & Electric Company of Pawtucket, R. I.

Joseph A. West, formerly chief engineer of the Ogden (Utah) Rapid Transit Company and the Ogden, Logan & Idaho Railway, has been appointed chief engineer of the Sumpter Valley Railroad of Oregon.

R. T. Guernsey has been appointed traveling freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa. The position of commercial agent at Cedar Rapids has been abolished.

Ernest Gonzenbach, who recently resigned as general manager of the Empire United Railways, Syracuse, N. Y., has been elected vice-president of the Allen Seed Company of Sheboygan, Wis., and has moved to that city, which was formerly his residence.

P. J. Kealy, president Kansas City (Mo.) Railways and colonel of the Third Regiment M. N. G., after a month's leave of absence has returned to his regiment at the border. Colonel Kealy was rejected temporarily by the federal army authorities on account of physical examination, but will now be re-examined.

Alfred F. Townsend has been appointed local manager of the Stone & Webster properties in Beaumont and Port Arthur, Tex. Mr. Townsend has been associated with Stone & Webster for the last fifteen years and identified during that period with the public service utilities at Lowell, Mass.; Ponce, Porto Rico; Sydney, Nova Scotia, and with the Glace Bay Railway. For the last seven years he has been manager of the Woonsocket (R. I.) Electric Machine & Power Company.

W. B. Voth, recently chief engineer and purchasing agent of the Empire United Railways, N. Y., is a native of Milwaukee, Wis., and a graduate in the electrical engineering course of the University of Wisconsin in 1897. After several years in the construction and operation of hydroelectric properties in Wisconsin, he was appointed resident engineer in Sheboygan in 1904 for the building of a steam power station, the reconstruction of the commercial and street lighting system and the building of a single-track inter-urban railway. After the completion of this work he remained to operate the line as general superintendent. About two years ago he became chief engineer and purchasing agent of the Empire United Railways.

John F. Vaughan has been retained by the banking house of Estabrook & Company, Boston, Mass., as consulting engineer in connection with the redevelopment of a 20,000-kw. hydroelectric plant at the Canadian Sault, and has opened an office at 185 Devonshire Street, Boston, for the practice of consulting engineering. Mr. Vaughan has been employed for about fifteen years by the Stone & Webster Engineering Corporation and has been active in connection with power transmission and hydraulic problems, having served as chairman of the hydraulic section of the National Electric Light Association prime movers committee. He was engaged in steam railroad electrification work with the late N. H. Heft before joining the staff of Stone & Webster, taking part in the initial engineering associated with the Nantasket Beach line and other pioneer third-rail work. He is the inventor of the Vaughan hydraulic flow meter.

Walter Alexander has been appointed chairman of the Wisconsin Railroad Commission to succeed Halford Erick-



son, who resigned from that position in May. Mr. Alexander has been a member of the commission since February, 1915, previous to which he was for thirteen years assistant district master mechanic and district master mechanic of the Chicago, Milwaukee & St. Paul Railway. He was born in Glasgow, Scotland, in 1872, and was brought to this country in 1873. He served an apprenticeship as a machinist and draftsman with the Chicago, Milwaukee & St. Paul Railway, later being employed as a fireman on the same road. He entered the University of Wisconsin in 1893, and graduated from the course in mechanical engineering in 1897. For three years he was an instructor in engineering at the University of Wisconsin, one year at Armour Institute and one at the University of Missouri. He then returned to railway work as assistant district master mechanic of the Chicago, Milwaukee & St. Paul at Minneapolis, Minn. Two years later he was transferred to Milwaukee, Wis., to a similar position, and later was promoted to district master mechanic at that point.

**Britton I. Budd**, of the governing committee of the Chicago (Ill.) Elevated Railways, and president of the elevated railroads controlled by that company, has been elected president of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Budd thus adds to his responsibilities as operating head of 184 miles of elevated railway, more than 160 miles of high-speed suburban and interurban railway. Mr. Budd was born at San Francisco, Cal., on Sept. 7, 1871. He was educated in the public schools of Chicago and at the Shattuck School, Faribault, Minn. He entered railroading in the engineering corps of an Ohio railroad, and was with the Intramural Railroad at the World's Fair, Chicago. In 1894 Mr. Budd entered the service of the Metropolitan West Side Elevated Railway, Chicago, as a clerk in the storekeeper's office, and was storekeeper for five years. In 1899 he was made purchasing agent, a position he held until April, 1907, when he was appointed general manager. In February, 1910, Mr. Budd was elected president of the Metropolitan West Side Elevated Railway, and in 1911 became operating head of all the elevated railways in Chicago.

**Samuel Insull**, president of the Commonwealth Edison Company, Chicago, Ill., has been made chairman of the board of directors of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Insull is one of the foremost men in the public-utility field in the United States. He was born in London, England, in 1859. In February, 1881, he became private secretary to Thomas A. Edison, of whose business affairs he had full charge for many years. When the various Edison manufacturing concerns, with the Edison Electric Light Company, were consolidated into the Edison General Electric Company, Mr. Insull became second vice-president in charge of manufacturing and selling, and when the company was consolidated in 1892 with the Thomson-Houston Company as the General Electric Company he became second vice-president of the latter company. Mr. Insull, besides the interests already noted, is connected with the Middle West Utilities Company as president, the Chicago Elevated Railways as trustee, the Chicago & Oak Park Elevated Railroad as receiver, the Metropolitan West Side Elevated Railway as chairman of the board, the Northwestern Elevated Railroad as chairman of the board, the South Side Elevated Railroad as chairman of the board, the Sterling, Dixon & Eastern Electric Railway as president, the West Penn Traction & Water Power Company as president, the West Penn Traction Company as president, the West Penn Railways as president, the Twin States Gas & Electric Company as president, the Wheeling Traction Company as president, and the People's Gas, Light & Coke Company (Chicago) as chairman of the board.

#### OBITUARY

**Walter Chur**, president and general manager of the American Railway Supply Company, New York, died on Aug. 29 at his home in East Orange, N. J., from heart disease.

**James A. Leslie**, for the last twelve years superintendent of the Fourth Street Division of the United Railways of St. Louis, died on Aug. 18. He is survived by a widow and seven children.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

#### RECENT INCORPORATIONS

**Northwestern Connecting Railway, Meadville, Pa.**—Chartered in the interests of the Northwestern Pennsylvania Railway, to construct a line between Silverling's Corners and Cambridge, Pa.,  $3\frac{1}{2}$  miles. Incorporators: Charles M. Hatch, vice-president and general manager, and A. A. Culbertson treasurer, Northwestern Pennsylvania Railway, Erie.

#### FRANCHISES

**Mill Valley, Cal.**—The Superior Court of Contra Costa County has declared the franchise of the Marin County Electric Railway in Mill Valley forfeited owing to the failure of the company to construct the line. [May 6, '16.]

**Bridgeport, Conn.**—The appeal of the Connecticut Company relative to the abandonment and removal of its tracks on East Washington Avenue, from Main Street to Noble Avenue, has been denied by the Public Utilities Commission of Connecticut. The petition was also refused by the mayor and Common Council of Bridgeport.

**Henderson, Ky.**—An ordinance has been placed by the Council of Henderson providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical and the company has stated that it does not plan to bid for the privilege of operating under it. Further reference to the franchise is made on page 416.

**Methuen, Mass.**—The Bay State Street Railway has received a franchise from the Council to relocate its track on Lowell Road.

**Newark, N. J.**—The Public Service Railway has asked the Board of Works for a fifty-year franchise to construct a double-track line on Roseville Avenue, from Orange Street to Bloomfield Avenue.

**Dunkirk, N. Y.**—Claiming it has been operating the Dunkirk belt line at an annual loss of \$17,000, officials of the Buffalo & Lake Erie Traction Company appeared before the City Council of Dunkirk and urged approval of its application to abandon this service and take up the track. Decision was reserved.

**Cincinnati, Ohio.**—The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad is seeking a renewal of its twenty-five year franchise. The company proposes to float a \$1,000,000 bond issue with which to build a  $6\frac{1}{2}$ -mile extension into Cincinnati when the rapid transit terminal is completed if the renewal is granted.

#### TRACK AND ROADWAY

**Visalia Electric Railroad, Exeter, Cal.**—A contract has been awarded by this company to Robert Sherrer Company, San Francisco, for grading 20 miles of line. Work has been begun at Strathmore on the new extension of the Visalia Electric Railway, and the line will be built immediately into the El Mirador country. The next move of the company will probably be the branch into Lindsay, the plans for the routing of which the company is now working out. Work has already been begun on the Santa Fé branch southward. The present terminus of that line is in Lindsay, although the orchards to the south are being penetrated by crews of workmen and the trees in the line of the route are being uprooted.

**Municipal Railway of San Francisco, San Francisco, Cal.**—A contract has been awarded to the United States Steel Products Company, San Francisco, under contract No. 86, for furnishing and delivering rails and rail joints for the Twin Peaks Tunnel line.

**Bridgeport & Danbury Electric Railway, Danbury, Conn.**—It is reported that several capitalists are going over the



proposed route of this company's line to Danbury, with a view to constructing the road and investing in the proposition. The cost of building the line is estimated at \$400,000.

**Atlanta & Anderson Electric Railway, Atlanta, Ga.**—The enactment of the interurban act by the General Assembly makes possible the construction at an early date of the Atlanta & Anderson Electric Railway, to extend from Atlanta through northeast Georgia and connecting at Anderson, S. C., with the interurban line of the Piedmont-Northern Railway. A charter for the new railway company will soon be applied for. J. L. Murphy, Atlanta, is interested. [July 22, '16.]

**Pocatello Traction & Interurban Company, Pocatello, Idaho.**—W. K. Palmer, of the W. K. Palmer Engineers Company, Kansas City, is going over the proposed route of the Pocatello Traction & Interurban Company, preparatory to making preliminary and location surveys. The purpose of the company is to develop a project for building a heavy electric traction line for freight and passenger business. The proposed line will connect with the present line of the Ogden, Logan & Idaho Railway at Preston, Idaho, and extend north through Downey, Pocatello, Idaho Falls, Ashton and Yellowstone, Mont., with a possible connection north to the Northern Pacific Railroad in Montana. The line will be from 200 to 250 miles in length, as nearly as can be determined at the present time. It will include single track of standard heavy construction and catenary overhead. All trains will be operated by electric locomotives, with power from one of the present established systems in operation in that vicinity. The project is entirely independent of any of the present railroad systems, and will make freight its first consideration. [July 15, '16.]

**Union Traction Company of Indiana, Anderson, Ind.**—This company is installing new rails in the curve at the corner of Thirteenth and Meridian Streets, Anderson. The construction of new track on South Meridian Street will be begun soon.

**Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.**—The necessary right-of-way has been acquired by this company for the double-tracking of its line from the Indianapolis city limits to the motor speedway, 1 mile.

**Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.**—It is reported that this company is considering the construction of an extension to Evanston.

**United Railways & Electric Company, Baltimore, Md.**—This company has completed and placed in operation its extension of the St. Paul Street line to Guilford, 1 mile.

**Berkshire Street Railway, Pittsfield, Mass.**—About \$25,000 will be spent by this company in improvements in Pittsfield during this summer. New tracks are being laid in Tyler Street and West Street.

**Detroit (Mich.) United Railway.**—Work preliminary to the construction of this company's new line on Hamilton Boulevard in Highland Park from the city limits to the Six Mile Road, for which permission was recently voted by the electors of the village, was begun last week. The line will be double-tracked and constructed in the center of an ornamental parkway to be created by the village. Work will begin within two weeks on the construction of a double-track extension of the West Warren line from its present terminus to the city limits. It is expected that the line connecting Victor Avenue with Forest Avenue East will be in operation within thirty days. Starting from the easterly terminus of the new line, the cars will run west to Gratiot Avenue, there taking the Gratiot tracks to Mount Elliott Avenue, following this line to Harper Avenue, where they turn west over the tracks of the Grand Belt route along Milwaukee Avenue as far as Chene Street and Jos. Campau Avenue, then going north on this line to the Davison Road, where they will turn west over the tracks now being constructed to Oakland Avenue and then north on Oakland Avenue to Victor Avenue to the big Ford Motor Company's plant. The entire line will be double-tracked except that portion of Jos. Campau Avenue between Caniff Road and Davison Road.

**New York Municipal Railway Corporation, Brooklyn, N. Y.**—The contract for the installation of tracks on the

Broadway-Fourth Avenue system in Manhattan and Brooklyn, from Fifty-ninth Street, Manhattan, to a connection with the Flatbush Avenue extension of the Interborough Rapid Transit Company, has been awarded to T. H. Reynolds Contracting Company, New York, at \$288,400. The work includes the installation of about 25 miles of single track, the city furnishing rails and most other materials, the contractor furnishing labor, concreting materials, and a small amount of cast-iron pipe. Bids will be received by the Public Service Commission for the First District of New York until Sept. 13 for the construction of Section No. 1-B of Route No. 12 in Brooklyn.

**Interborough Rapid Transit Company, New York, N. Y.**—Bids will be received by the Public Service Commission for the First District of New York until Sept. 8 for the supply of four portions of special work for use in the construction of the Pelham branch of the subway. Bids will also be received by the commission until Sept. 8 for the installation of tracks for the Seventh Avenue branch of the Seventh Avenue-Lexington Avenue line in Manhattan and Brooklyn.

**Piedmont & Northern Railway, Charlotte, N. C.**—This company will construct an 8-span, deck-plate girder bridge, 700 ft. long and 55 ft. above normal water, across the Catawba River, at Mt. Holly, to replace the structure recently destroyed by flood. The contract for steel work has been awarded the Virginia Bridge & Iron Company, Roanoke, Va., and the contract for masonry to Thomas Sheahan, Hagerstown, Md. The cost of the structure is estimated at \$125,000.

**\*Bartlesville, Okla.**—The W. K. Palmer Engineers Company of Kansas City is now engaged in making location surveys and preparing plans and specifications for an electric interurban railway to connect Bartlesville with Nowata, Welch or Blue Jacket and Miami. The line will be about 70 miles long, and will consist of standard heavy construction, with catenary overhead, and will carry both freight and passengers. The road will probably generate its own power. All arrangements for capital have been made. D. F. Mason and F. M. Overless, Bartlesville, are interested.

**Oklahoma & Interstate Railway, Oklahoma City, Okla.**—A party of four capitalists from Philadelphia, who will furnish the capital for the construction of the Oklahoma & Interstate Railway, were recently expected to arrive in Kansas City to go over the lines of the northern division of the line. This part of the system has already been located by the W. K. Palmer Engineers Company, Kansas City. It is expected that arrangements will be made to go forward with the construction at once. John R. Rose, Oklahoma City, president. [April 29, '16.]

**London, Ont.**—Surveys are being made by engineers of the Ontario Hydro-Electric Power Commission for an electric railway from London to Owen Sound, 175 miles, and they will prepare estimates of the cost as soon as possible.

**London & Port Stanley Railway, London, Ont.**—Announcement has been made by the London Railway Commission, operating the London & Port Stanley Railway on Lake Erie, of certain improvements, including a grain elevator to cost \$100,000, a new tea house, and a public bathing house containing one thousand rooms; also about 12 miles of double tracking.

**Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.**—Work has been begun on this company's proposed line from Womelsdorf to Myerstown, and it is expected that the line will be placed in operation within a year. Leroy R. Valentine, Womelsdorf, president. [Aug. 5, '16.]

**South Carolina Light, Power & Railways Company, Spartanburg, S. C.**—This company has awarded to the J. G. White Engineering Corporation, New York, a contract for the consulting engineering in connection with the design and erection of a concrete dam 600 ft. long and 45 ft. high, on the Broad River, near Gaston Shoals, approximately 30 miles from Spartanburg. This dam will be in connection with the company's hydroelectric development at Gaston Shoals.

**Marlin-Temple Interurban Company, Marlin, Tex.**—In connection with its proposed electric railway from Marlin to Temple, this company will construct three bridges. S. D. Hanna, Temple, chief engineer. [Aug. 19, '16.]



**San Antonio (Tex.) Traction Company.**—This company is acquiring additional land and is building siding and extra tracks at and leading to all depots in San Antonio, to provide facilities for handling the crowds to and from the depots and the business section of the city.

**Wisconsin Interurban System, Madison, Wis.**—This company has awarded a contract to John T. Adams, Columbus, Ohio, for grading on the section of its interurban line from Madison to Stoughton. J. E. Jones, Madison, president and general manager. [May 27, '16.]

#### SHOPS AND BUILDINGS

**Southern Pacific Company, San Francisco, Cal.**—This company has awarded a contract to Lindgren Company, San Francisco, for the construction of a ten-story office building at San Francisco. It is stated that the structure will cost about \$2,000,000.

**Arkansas Valley Interurban Railway, Wichita, Kan.**—It is reported that this company plans the construction of a new carhouse.

**Michigan Railway, Kalamazoo, Mich.**—This company contemplates the construction of a 7-story terminal station at Grand Rapids. The building will have a large waiting room, and cars will enter the terminal over eighteen tracks.

**Cleveland & Youngstown Railroad, Cleveland, Ohio.**—It is reported that this company, which proposes to construct a line between Cleveland and Youngstown, contemplates the construction of a freight terminal and warehouse at Broadway and Orange Avenue. The structure will be 150 ft. x 400 ft., six stories high, and will be of reinforced concrete, brick and steel. The cost is estimated at \$1,000,000. W. J. Watson & Company, Leader News Building, Cleveland, are the architects and engineers. W. E. Pease, Cleveland, engineer for the company.

#### POWER HOUSES AND SUBSTATIONS

**Bangor Railway & Electric Company, Bangor, Me.**—A new substation will be erected by the Bangor Railway & Electric Company at East Corinth, to be used for the extension of the company's lighting and power service in the vicinity.

**Bay State Street Railway, Boston, Mass.**—It is reported that this company contemplates the construction of an extension to its generating station at Quincy Point, making the station twice its present size. It is stated that five turbines will be installed of the same capacity as those now operated. The cost of the addition to the building is estimated at about \$70,000.

**Iron River, Stambaugh & Crystal Falls Street Railway, Iron River, Mich.**—A report from this company states that it will purchase a 300-kw. rotary converter.

**Beaver Valley Traction Company, New Brighton, Pa.**—The powerhouses of this company at Junction Park and Economy will be abandoned. Power will be generated from Brunots Island. Three substations will be built by the company and transformers installed.

**Nashville Railway & Light Company, Nashville, Tenn.**—This company has installed a 2000-kw. motor-generator set at its central station, consisting of a 2800-kva., 2300-volt, three-phase synchronous motor, direct-connected and unit-mounted with a 200-kw., 600-volt generator and 150-kw., 250-volt exciter. This replaces two 500-kw. and one 1000-kw. rotary converters. The motor-generator set is connected to the station buses, and can be driven either by the local steam units or by energy from the Tennessee Power Company's Ocoee hydroelectric plant. The new equipment is designed to take care of a 50 per cent overload, so that the peak load of the railway traffic may be cared for without surplus installation, on the basis of a fairly average load. A 500-kw. motor-generator substation has also been installed to improve service on the West Nashville lines, which were formerly operated by power from a 7-mile transmission line. As a result considerably faster schedules have been arranged. This motor is also synchronous. The high-tension line is operated at 13,200 volts, 60 cycles, three-phase and the motor is rated at 700 kva., with a 500-kw. generator and 11.5-kw. exciter, unit-mounted. The set is capable of running continuously for twenty-four hours and of running two hours on 50 per cent overload.

## Manufactures and Supplies

### WESTERN AND NORTHERN CEDAR SHIPMENTS ABOVE AVERAGE

**Pole Line Construction Less Than Indicated Early in Year,  
Due to High Cost and Delayed Deliveries  
of Fittings**

It now appears that the transmission line construction during 1916 will total less than for several past years. High prices for line wire and pole fittings and the slow deliveries of these essentials have, in turn, caused a reduction in pole shipments for this purpose. However, the Western Red Cedar and the Northern White Cedar Associations report that for the first six months of 1916 the demand for cedar poles has been better than that of an average half-year.

In many respects the conditions surrounding the marketing of Northern and Western Cedar during the first half of the year were similar. At the beginning of the year indications were numerous that 1916 was to see a strong demand for poles. Producers and distributors received many inquiries for prices and estimates on expected pole requirements. Evidence was plenty that pole line construction which had been held back since the European war started would be pushed to completion during 1916. Indications pointed to a boom demand.

As time went by, however, it became evident that slow delivery of other materials used in pole lines were delaying some of this construction. This particularly affected the larger undertakings, such as long-distance projects.

This is the situation as it exists to-day. The companies operating in both the Northern and Western cedar-producing sections have felt the car shortage to some extent, but the cedar companies generally have been able to make quite satisfactory deliveries. Shipments of Western red cedar have frequently traveled across the country from Idaho and Washington in quick time.

Both Northern and Western cedar producers report a steadily widening market for cedar poles. Cedar is being shipped more and more into territory hitherto controlled by local woods. The use of Western red cedar poles is said to be increasing in outlying districts of large cities where beauty of pole line is demanded. Electrical construction, in cities particularly, is demanding a straight, sturdy, symmetrical pole of light weight that will carry a heavy load. That Northern white cedar meets this requirement satisfactorily is shown by its increased use for such purposes by large companies operating in big cities.

The cedar companies report collections as satisfactory, and the production of western and northern cedar is said to be normal.

### RAPID INCREASE IN EXPORTS OF SUPPLIES

**Value of Railway Materials and Equipment Exported Shows  
Increase of More Than 100 Per Cent Since 1914**

According to figures compiled by the Bureau of Foreign and Domestic Commerce, railway materials and equipment valued at \$75,000,000 were exported from the United States in the last fiscal year. The exports of this class have more than doubled since 1914.

The material shipped to Russia, France and Spain, practically new foreign markets for this equipment, accounts for a large proportion of the increase. Figures for June exports, given below, show that Russia received over 67 per cent of the freight cars exported, France received over 68 per cent of the steel rails and Spain received 37 per cent of the steam locomotives.

Until very recently Canada and Cuba have been the foremost foreign markets for our freight cars; Cuba, Canada and Brazil the largest markets for exported locomotives, and Canada, Australia, Japan, Brazil, Argentina and Cuba the leading markets for our steel rails. At present we are sending unusual quantities of freight cars and other supplies to Russia chiefly via her Pacific frontier, and, of course, consignments are going also to France and Spain as well as to



our established markets in Cuba, Canada and Central America. The following figures for June exports indicate the present important markets for railway supplies; the total exports of freights cars for the month was valued at \$1,613,000 of which \$1,086,000 worth went to Russia. Steel rails to the value of \$1,730,000 were sold abroad during the month, the exports to France alone amounting to \$1,188,000. Of the \$721,000 worth of steam locomotives sold abroad, \$272,000 went to Spain.

The quantities of railway material exported during the fiscal year ended June, 1916, as compared with the fiscal year 1914, are shown in the following table:

Classes of Railway Material Exported	Fiscal Year 1916	Fiscal Year 1914
Railway cars .....	\$26,660,000	\$11,178,000
Rails for railways .....	17,687,000	10,259,000
Locomotives, steam .....	12,666,000	3,692,000
Locomotives, electric .....	455,000	437,000
Engine parts (all kinds) .....	7,274,000	3,357,000
Switches and other track materials .....	5,262,000	2,534,000
Ties .....	2,435,000	2,565,000
Railroad spikes .....	1,399,000	346,000
Car wheels .....	742,000	414,000
Telegraph instruments .....	149,000	137,000
	\$74,729,000	\$34,919,000

### NOVEL AND SUCCESSFUL EMPLOYMENT METHOD Newspaper Advertisement for Labor in Cleveland Brings Satisfactory Results

Selling a job to a worker is a new way to get good, earnest applicants for shop jobs in these times of scarce labor. The Lincoln Electric Company, Cleveland, needs men and does not feel that it should be called upon to bid for men against concerns that offer only temporary jobs at munitions manufacture, so it is successfully gathering into its organization good, earnest workers by advertising salesmanship. Space 4 in. high and two columns wide is used in the local papers. Portraits of workers are shown with descriptive titles about their service, as for example, "Age twenty-three, worked two years, now making \$25 a week with bigger pay ahead."

The text of the advertisement reads as follows:

"Learn the electrical business.

"This week we will give twelve young men (eighteen years or over) a chance to learn the electrical business in our plant.

"We will teach them a line of work so that they can always get good positions elsewhere. We guarantee steady work here to good men.

"Good pay while learning.

"In two months' time a bright boy can be earning high wages. Pay according to work done. Should be able to speak, read and write English and must be quick with hands. Manual training school or shop training will help, but not necessary.

"Only twelve chances open. Come to general office and ask for Mr. Meeks.

"The Lincoln Heater Company, East Thirty-eighth Street and Kelley Avenue."

These advertisements inserted frequently have brought good young men to the plant, those who have their future in view and are desirous of getting into work where they can grow, rather than disregard the future for immediate salary. It is pointed out that this is a simple method which any electric railway might follow if it desired to increase its forces.

### EUROPEAN LUMBER MARKETS TO BE INVESTIGATED

At a conference held in Chicago on Aug. 21 the Government, through the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the lumber manufacturers of the United States decided to co-operate in sending abroad a corps of experts to study the condition of European lumber markets with a view to a great expansion of the field of the American producer. As a result of this conference the immediate passage of the Webb bill now pending in Congress will be urged. The passage of this bill will remove any question of the legality of the organization of foreign sales agencies to secure and distribute orders for American goods to be sent to foreign countries.

Detailed reports of conditions abroad show that Belgium, France, England, Scotland, Italy and Spain have exhausted their supply of lumber. Russia has great supplies of standing timber, chiefly Baltic pine, but owing to its lower quality it is not suited to the demand. Conditions in Germany have not been estimated. In order to secure the great volume of foreign lumber business when the rebuilding of these nations commences at the end of the war the American lumber industry must go after the trade systematically, with an advance knowledge of the needs of the various nations. It is hoped that the investigators and agents can be on their way abroad by Nov. 1.

### CAR COUPLERS IN DEMAND

The market for car couplers seems to be increasing faster than the number of cars ordered would indicate. Boston has placed a large order with the Ohio Brass Company for Tomlinson radial couplers. This calls for 200 surface car coupler equipments, including the air coupling attachments, and eighty-four heavy type coupler equipments for the elevated division. Moreover, 400 fifteen-point electric train-line couplers have been ordered for multiple-unit service in the East Boston Tunnel. This is sufficient equipment for 100 cars. The Toledo Railways & Light Company has ordered 120 coupler equipments to include air and five-point electric connections.

Coupler orders from interurban roads are frequent but of course do not call for such large quantities as the city road orders. Interurban type couplers totaling nearly 1000 in number have been sold by the Ohio Brass Company so far this year. The interurbans seem to be running more two-car trains than before and according to the opinion of the coupler manufacturers multiple-unit and trailer service in the cities also is on the increase.

### PRICE OF ZINC MAKES COST OF EXTRUDED BRASS TROLLEY EARS PROHIBITIVE

The jump in the price of zinc of more than 240 per cent since 1914 has forced such an increase in the price of extruded brass trolley ears that some roads which, from the service standpoint, greatly favor the extruded ear have found it necessary on the score of lower first cost to return to the use of cast bronze ears. The yellow brass from which extruded ears are made contains about 40 per cent zinc, while ordinary bronze ears are cast from a mixture containing about 5½ per cent zinc and about the same amount of tin. The increase in the price of tin has been around 40 per cent, and copper about 125 per cent, while zinc has shown an increase as high as 245 per cent. Thus, with the much larger content of zinc and its great increase in cost to the overhead manufacturer, he has been forced to price extruded brass ears so high that their exceptional service qualities are outweighed by the lower first cost of cast bronze ears.

### ROLLING STOCK

Ithaca (N. Y.) Traction Corporation has ordered one snow sweeper from The J. G. Brill Company.

Waterville, Fairfield & Oakland Railway, Waterville, Me., is reported to have purchased two cars.

Boston (Mass.) Elevated Railway has ordered from the Laconia Car Company 100 sets of arch bar trucks for center-entrance surface motor cars.

Northern Ohio Light & Traction Company, Akron, Ohio, is in the market for fifteen all-steel, interurban passenger motor and trail cars similar to those ordered early in the year from the Jewett Car Company.

Ogden, Logan & Idaho Railway, Ogden, Utah, has ordered three new all-steel interurban motor cars from the American Car Company. These cars will be equipped with four 115-hp. motors and will have an overall length of 65 ft. Delivery is expected about Sept. 15.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has ordered one 50-ft. observation parlor trail car, two 42-ft. 2-in., center-entrance, interurban cars of steel side-girder construction, and one 42-ft. 6-in., double-truck



city car body from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Gary & Interurban Railroad, Gary, Ind., noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12 as contemplating the purchase of ten or twenty cars, is having specifications prepared for six motor cars which will be approximately 42 ft. long, 8 ft. 4 in. wide, center-entrance type, double-end operation, double trucks and four motors. Specifications are also being prepared for fourteen trail cars which will be approximately 43 ft. long, center-entrance type and double-end operation.

#### TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the New York, New Haven & Hartford Railroad for a large number of trolley-wire splicers.

Arc Welding Machine Company, New York, N. Y., will have an exhibit at the New York Electrical Exposition featuring electric welding of iron and steel. A special type of self-regulating generator will be used.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has recently added three mechanical engineers to its sales force in the field. Herbert H. Cummings will be located in Chicago, Russell B. Pratt in Milwaukee and Fred L. Stevenson in Detroit.

Johnson Fare Box Company, Chicago, Ill., through its general Eastern agent, the U. S. Metal & Manufacturing Company, has received an order for sixty fare boxes from the Public Service Railway, Newark, N. J., and an order for twenty-five from the International Railway, Buffalo, N. Y.

Holden & White, Chicago, Ill., have received an order from the Milwaukee Northern Railway for fifteen Wasson air-retrieving trolley bases. The Fort Dodge, Des Moines & Southern Railroad has ordered four of these bases for use on new cars being built by the McGuire-Cummings Manufacturing Company.

Railway Improvement Company, New York, N. Y., has received an order from the General Electric Company for seventeen C. & S. coasting recorders for the Melbourne, Brunswick & Coburg Tramways Trust. This company has also received an order from the Capital Traction Company for 100 No. 3 sanitary strap covers.

Peter Smith Heater Company, Detroit, Mich., reports that it has recently received the following orders: Two type 3-C hot water heaters, St. Joseph Valley Railway, five No. 2-P for the Chicago & West Towns Railway, and twenty of the same type for the Michigan Railway. Also twenty-five No. 3-P for the Madison Railways.

Frank J. Engel and Herman P. Hevenor have formed a co-partnership for carrying on an engineering and contracting business under the firm name of Engel & Hevenor, with offices at 220 Broadway, New York. Mr. Engel was recently with the Boston & Albany Railroad and Mr. Hevenor with the New York, New Haven & Hartford Railroad and previous to that with the Brooklyn Rapid Transit Company.

Roller-Smith Company, New York, N. Y., announces that the O. H. Davidson Equipment Company, Ideal Building, Denver, Col., will handle Roller-Smith apparatus in Colorado, Wyoming, New Mexico and parts of the state of Montana, Idaho, Arizona, Texas and South Dakota. The O. H. Davidson Equipment Company, having specialized in the sale of apparatus, is well equipped to handle the Roller-Smith Company's various lines of instruments, meters and circuit breakers.

Safety Car Devices Company, St. Louis, Mo., reports that it has received orders for fifty light-weight air brake equipments for one-man cars, although the majority of these have not yet been installed. The installation of eight sets of equipment for the City Light & Traction Company, Sedalia, Mo., has recently been completed. This company will have complete double-end equipment which operates the door as well as the brakes from the motorman's brake valve handle on exhibition at the electric railway convention at Atlantic City.

#### ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a new price-list, dated Aug. 23.

Pelton Water Wheel Company, San Francisco, Cal., has issued bulletin No. 9, describing and illustrating the Pelton-Doble centrifugal pump.

Cutler-Hammer Clutch Company, Milwaukee, Wis., has issued Bulletin 12 describing and illustrating its high-duty lifting magnets, circular type.

Crouse-Hinds Company, Syracuse, N. Y., has issued bulletin No. 1000-E describing, illustrating and giving the prices of its various types of condulets.

Peter Witt, Cleveland, Ohio, is distributing an illustrated circular entitled "The Car Rider's Car," which describes in detail the construction and advantages of the front-entrance, center-exit, pay-enter, pay-leave car.

Portland Cement Association, Chicago, Ill., has issued a booklet on "Concrete Swimming and Wading Pools and How to Build Them," and another entitled "Concrete Sewers." Copies of these publications may be had upon request.

American Steel Foundries, Chicago, Ill., has issued a booklet entitled "Making Davis Wheels." It shows in a brief pictorial way how the Davis steel wheel is made, and emphasizes the precautions used in the manufacture of a high-grade steel casting.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued a booklet entitled "Better Electric Motors." Numerous illustrations show various applications of S. K. F. bearings. This company is also distributing a pamphlet which contains testimonial letters from sixteen electrical engineers located in various parts of the United States.

William B. Scaife & Sons Company, Pittsburgh, Pa., has issued a catalog entitled "Water Purification for All Purposes," which illustrates the various types of water-softening-and-purifying apparatus manufactured by it, and discusses water purification as applied to various industrial uses. A large number of illustrations show installations of water-purifying equipments.

Imperial Brass Manufacturing Company, Chicago, Ill., has issued a handbook on welding and cutting, the text of which is free from technical language. As stated in the preface, the purpose of this booklet is "to give an elementary knowledge of the apparatus, its use and how to properly keep it in good working condition." This book is given free to all purchasers of Imperial equipment and is sold to others at \$1 per copy.

Smith-Ward Brake Company, New York, N. Y., has recently issued four illustrated pamphlets, one on the application of S. W. B. automatic slack adjusters for M. C. B. trucks, one for maximum traction trucks with brake beams, one for clasp-brake trucks, and one for trucks equipped with brake beams of the class of Brill 27-E., Standard 0-50 and Taylor S. B. This company has also issued a pamphlet on the new brake-lever strut it has recently placed on the market.

Peter Smith Heater Company, Detroit, Mich., has just issued its first electric gravity heater catalog, containing thirty-six pages of descriptive matter and illustrations of this product which has recently been added to the other heater equipment manufactured by this company. A number of large orders for the Peter Smith electric gravity heaters have already been filled, and all these heaters are being sold under a guarantee against defects in material and workmanship. The catalog describes in detail the heater elements and the various types of standard electric gravity heaters, which include the truss-plank type, double and single coil panel heaters, cross-seat heaters containing double and single coils, single-coil and four-coil cab heaters, four-coil platform heaters, switches and fuses. Copies of this catalog may be had upon request.

Company Sells 2000 Tons of Old Rails.—The Louisville (Ky.) Railway chose a timely occasion to dispose of its accumulation of old rails, selling about 2000 tons of this material last week at \$15 a ton and enriching the treasury of the company to the extent of \$30,000. The company has been holding its rails against a rise in the market, having decided to do so about four years ago, when the price for scrap was low. During this time the rails have been stored at various points about the city.





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"Ould Jack Rafferty," says an Irish tale, "was remarkable for a habit he had of always wearing his head under his hat."

A neat way of saying that Jack was all there.

Looking over our Peacock Brake orders and re-orders, we are pleased to see that it's the popular fashion for electric railways to carry their heads under their hats, too.

They bought Peacocks the first time because the design commended itself to them from a sound engineering standpoint.

They have kept on buying Peacocks because design, superior construction and materials made good in service; and because they have always found this company ready to co-operate in meeting special conditions of car design and operation.

Our organization is the only one devoted exclusively to the study of brake requirements and brake design.

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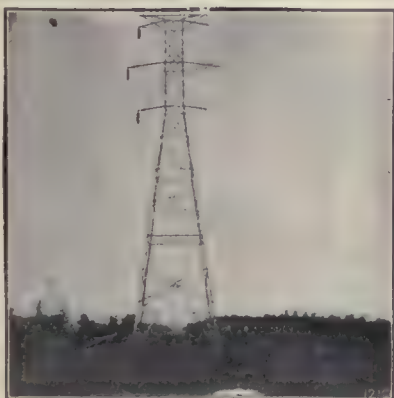
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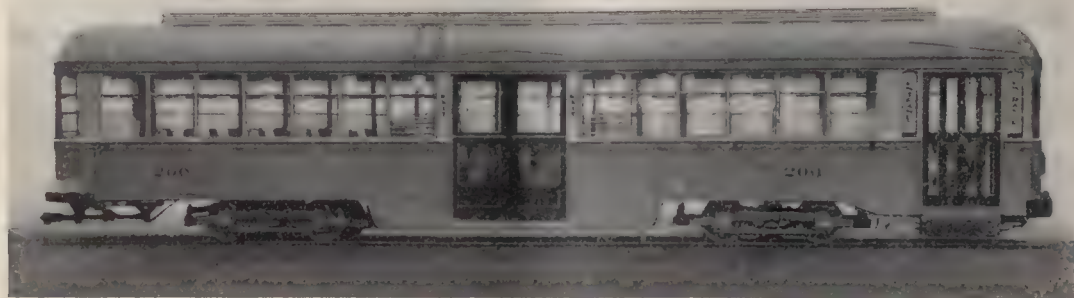
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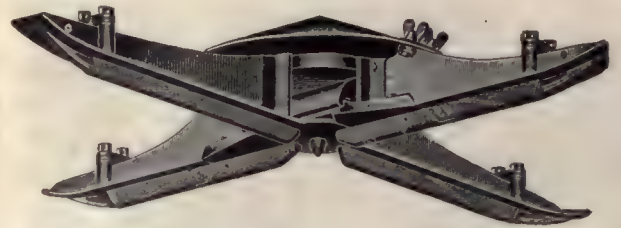
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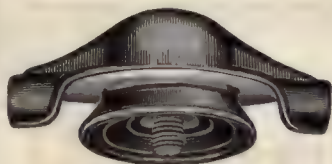
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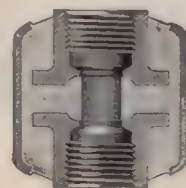
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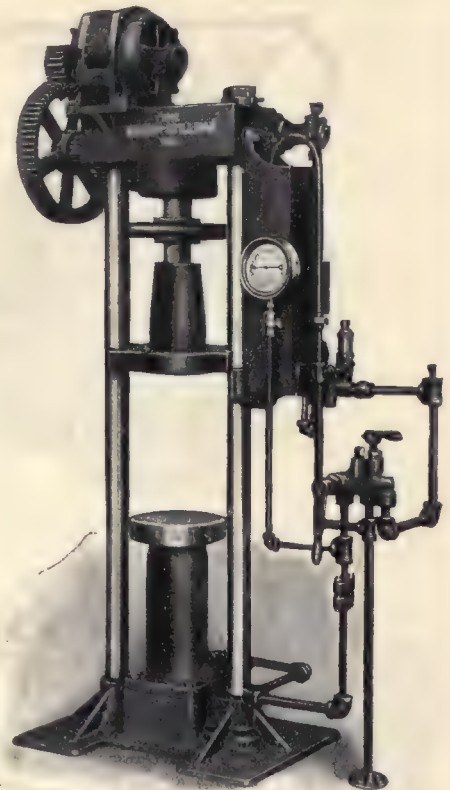


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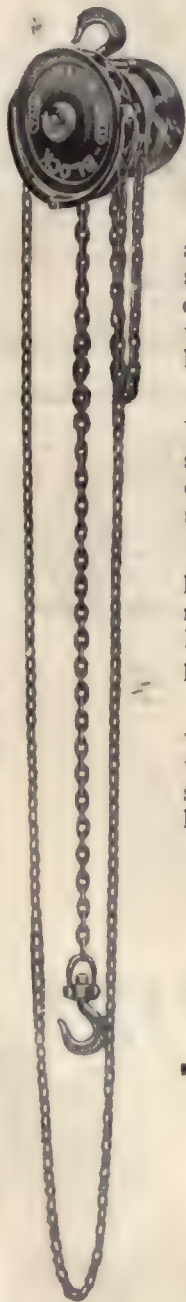
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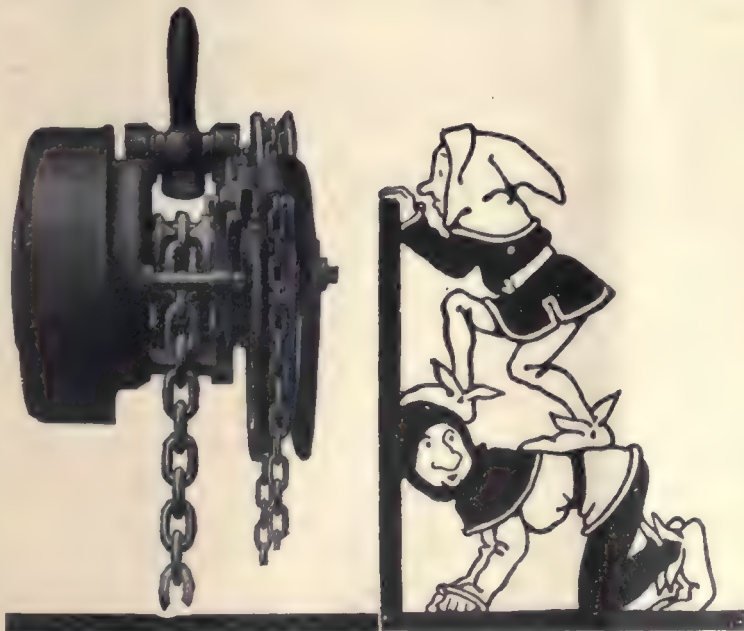
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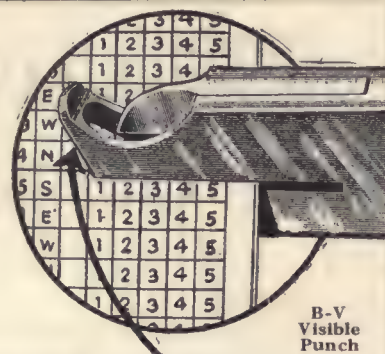
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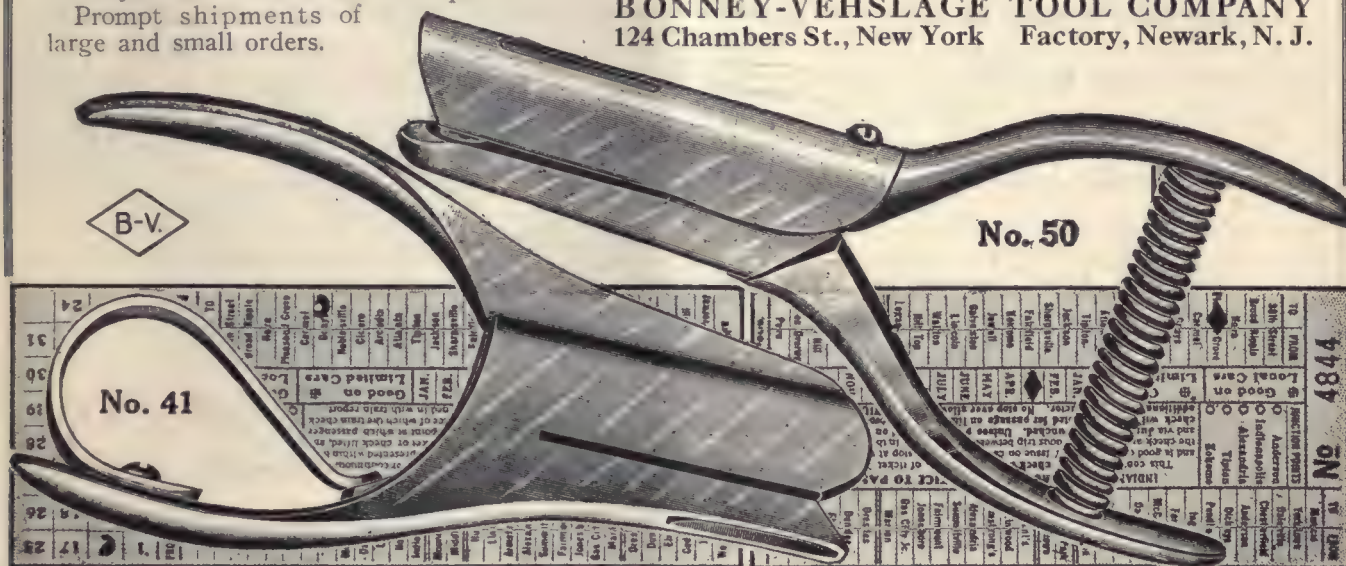
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The Bonham Recorder not only records cash but it keeps tab on passenger-mileage—the unit needed in computing operating costs and earnings.

**THE BONHAM RECORDER CO.**

Hamilton, Ohio, U. S. A.





# Why Don't You Find



## Out More About Fabrikoid?

Every square inch of Du Pont FABRIKOID is as good as the inch next to it.

Examination of a leather hide in various places shows plainly that the strength is seldom the same in any two places in the hide.

Every Master Car Builder should acquaint himself with the superior qualities of FABRIKOID for railroad uses before specifying materials for the work in hand.

Uniformity in strength of materials used by railroads for car seats, cab and caboose cushions is an absolute essential when you consider the extremely hard wear to which this class of material is subjected.

### A TRIAL ORDER

**and You Will Buy Du Pont Fabrikoid Regularly**

## Du Pont Fabrikoid Company

Du Pont Building, Wilmington, Del.

**Wendell & MacDuffie Company,**

Railroad Dept. Representatives, 61 Broadway, New York



# The RING Fixture

## HOLDS THE CURTAIN

(the same as other good fixtures)



## BUT IT ALSO LETS GO AT THE PROPER TIME

(as no other fixture will do)

and it performs both functions automatically. That is the principal difference between the good and the best.

We do not say others won't work when new and properly adjusted. But there is only one device which will **continue** to give complete satisfaction year after year regardless of wear, changes in the grooves, weakening of springs, etc., and that is the Ring Fixture.

The Ring Fixture is a simple patented device which is fundamentally correct. It keeps the curtain in the groove, keeps it level and does not creep. No other scheme has ever been devised which will do these things continually and automatically.

## CURTAIN SUPPLY CO.

322 W. Ohio St.

Chicago, Ill.





**Western Electric Company**  
INCORPORATED

Railway Sales Department  
195 Broadway, N. Y.

Kindly send me a copy of your booklet—  
"The Voice of the Road."

Did you send

for your copy of this booklet?  
It tells how

**Western Electric**

Telephone Equipment  
for Street Railways

will benefit your traffic. The  
coupon will bring it.

**Western Electric Company**  
INCORPORATED

New York	Atlanta	Chicago	Kansas City	San Francisco
Duffalo	Richmond	Milwaukee	St. Louis	Oakland
Newark	Savannah	Indianapolis	Dallas	Los Angeles
Philadelphia	New Orleans	Detroit	Houston	Seattle
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EQUIPMENT FOR EVERY ELECTRICAL NEED

## Save Your Conductors From Any Error

During rush-hour crowds, the conductor is so busy making change or issuing transfers that he cannot ring up fares as fast as deposited—errors are bound to occur with a counting type fare box and a hand-operated register.

### The INTERNATIONAL Motor-Driven Coin Register

eliminates the "human element" and registers fares automatically—it saves the conductor time and worry—the money collected and the amount registered are inevitably the same—it gives the conductor change without stopping to "crank" the fare box—it makes fractional registration of pennies or mutilated coins impossible.

This motor-driven coin register has proved so successful that it will pay you to write us for particulars regarding installation on your system.



Type C. 25

**The International Register Co.**

15 South Throop Street, Chicago, Ills.





### Edwards All-Steel Trap Doors

are another example of efficiency in facilitating car movements. They circumvent the trouble and delays that arise from swollen, warped or sticky wooden doors. They are noiseless in operation, and are more durable than wood. They are slightly cheaper in the beginning and overwhelmingly cheaper in the end.

## Opening the Door To Efficient Service

### Edwards Trap-door Plunger Locks

are more than a convenience. They are a necessity for securing that rapid take-on and discharge of passengers which is essential to the maintenance of fast schedules on interurban and suburban lines. A slight pressure of the foot on the plunger automatically raises the trap-door. It has that positiveness and power of action that is the result of simplicity of design and durability of construction.

Write for data on them and other paying Edwards specialties.

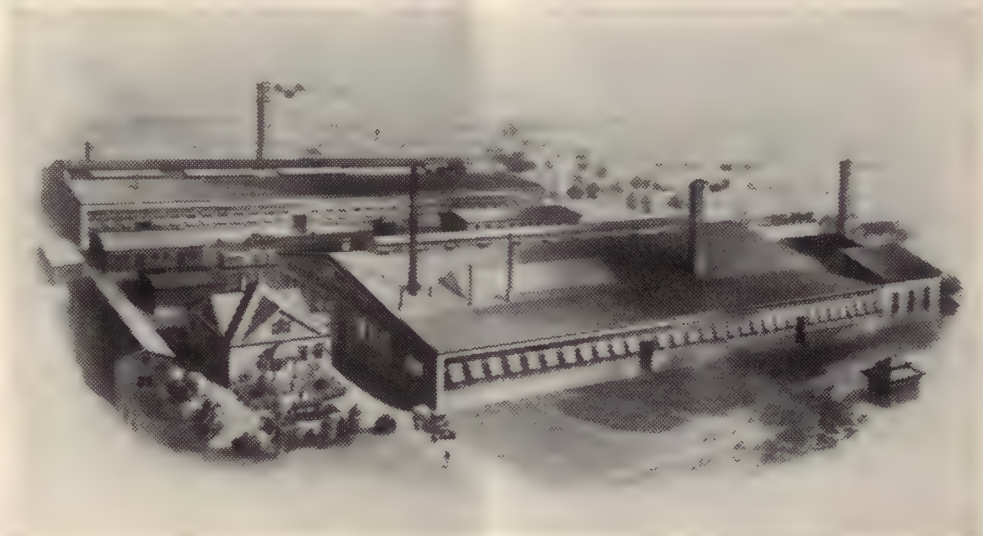
## THE O. M. EDWARDS CO., Inc.

Metal Extension Platform Trap Doors  
Top, bottom & side Weather-stripping  
Railway Devices

Syracuse, N. Y.

Window Fixtures  
All-Metal Sash Balances and Shade Rollers  
Metal Sash and Mouldings

**Makers of Carbons for Electrical Purposes for the Past Twenty-Five Years**  
Carbon Electrodes      Motor and Generator Brushes      Battery Carbons



## The Plant Behind the Speer Brush

Speer Carbon Co. Dept. "J".

St. Marys, Pa.



# Unchanging

as the rock-bound shores of our Northern coast, are the superlative characteristics which have placed

## "Le Carbone" Carbon Brushes

in the commanding position which they occupy. They are always uniform in quality—and in results.

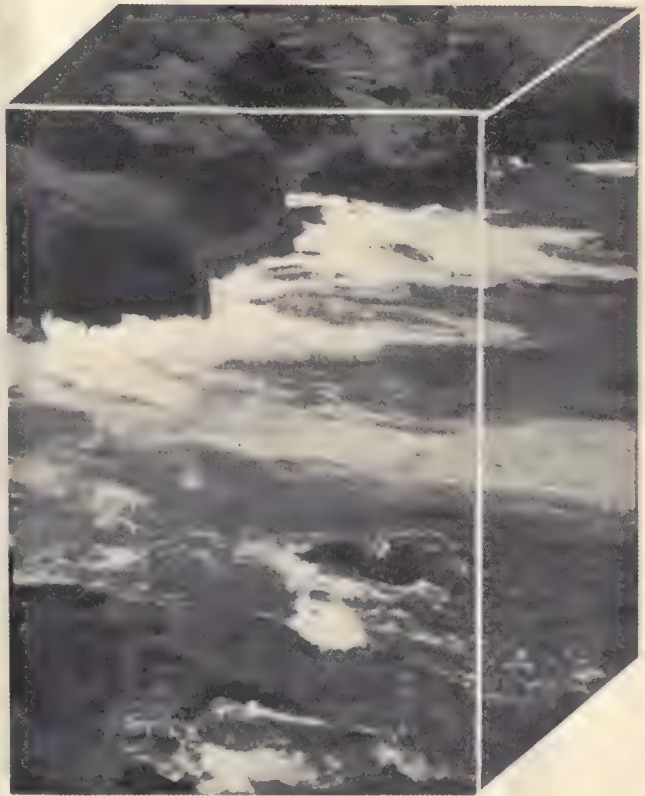
**W. J. JEANDRON**

173 Fulton Street New York City

Pittsburgh Office: 363 Wabash Building

Canadian Distributors:

Lyman Tube & Supply Co., Ltd., Montreal and Toronto



## What is the Ratchet-Winding Feature of the Earll Retrievers?

Conductors shy at retrievers that have to be wound with a long continuous pull on the rope—a dangerous operation when the car is in motion. This objection does not exist in

### Earll Retrievers

—they are wound up like the back-and-forth movement of a watch. The rope is simply ratcheted or reciprocated in and out, in long or short strokes as may be convenient.

Earll Retrievers are "sure-fire," too—they never miss. The twelve-tooth back assures action within a twelfth of a revolution.

The emergency release enables the conductor to run the pole up to the wire quickly—think what that means when a car is stalled on a steam crossing.

Several important new improvements have recently been built into Earll Retrievers, increasing their efficiency and reliability. These are fully described in our new Bulletin M. Write for it.



**C. I. EARLL**

Offices: 11 Broadway, N. Y. Factory: York, Pa.

The JOHN S. BLACK CO.  
New Orleans, La.

W. R. KERSCHNER CO., Inc.  
Eastern Sales Agts., 50 Church St., New York

BROWN & HALL  
St. Louis, Mo.



# For High Speed Operation

## —Large Diameter Kalamazoo Trolley Wheels



As a solution to arcing and short wheel life on high speed electric railway work, two new Kalamazoo Wheels have been designed.

They are (No. 20) 11½ inches and (No. 21) 10 inches in diameter. An ample increase of width, depth of groove and length of hub insures a well-balanced wheel in each case.

Tests covering considerable mileage at high speeds show that these two new "Kalamazoo's" greatly decrease sparking, while offering longer wheel life. There is more bearing on the wire, with consequent greater contact and current carrying capacity.

The patented Kalamazoo Harps have been enlarged to carry these wheels.

Try several on your lines. Compare their service with that of smaller wheels.

*Write Today.*

## STAR BRASS WORKS

KALAMAZOO, MICHIGAN



## High Trolley Maintenance Costs Flee Before the Bayonet

A Bayonet Harp will run continuously for four or five years. Our first Base, made ten years ago, is still giving perfect service. All wearing parts are renewable at very small cost.

BAYONET EQUIPMENT COSTS NO MORE than the old antiquated equipment that delays your cars a half hour or more to change a damaged trolley wheel or pole. Accidents seldom happen with our easy system of daily inspection.

**Bayonet Anti-Friction Base has all wearing parts bushed. Self-Lubricating. Non-Breakable, Poles Changed in One Minute.**



**ONLY TWENTY SECONDS AND YOUR HANDS ARE REQUIRED TO CHANGE A HARP HEAD AND WHEEL**

if you use BAYONET HARPS AND BASES. All repair work, lubricating and aligning done at the work bench, the only place it can be done right. Perfect alignment and lubrication saves wheels. Trolley axles have extra long bearings and are held more firmly than any other harp on the market. This feature with the extra large contact washers insures a true running wheel and perfect conductivity. We have the evidence that WHEELS IN BAYONET HARPS WEAR A THIRD LONGER than in other harps.

You can get the evidence in your own service by 60 DAYS' TRIAL.

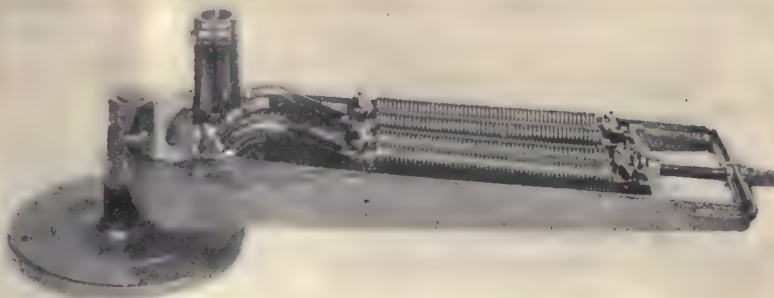
It costs you nothing if we don't make good.

## Bayonet Trolley Harp Co.

Springfield, Ohio, U. S. A.



**T**HESE Old Timers  
were built by us  
twenty - five years  
ago.



**Y**OU can buy new trolleys or interchangeable repair parts for  
them today.



**I**F you could buy repairs  
for certain trolleys now  
in your scrap heap they  
wouldn't be there.

**NUTTALL—PITTSBURG**

# Bound Brook Bushings

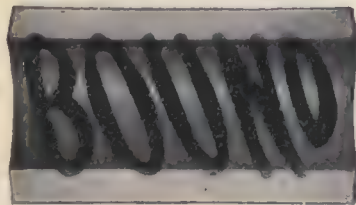
## Balance the Trolley Wheel from the Hub Outward

Balance is one of the qualities  
demanded of a first-class trolley  
wheel.

Begin right by fitting your trolley  
wheels with Bound Brook  
Graphite Bushings.

They are not only long-lived,  
but also absolutely uniform in  
texture and ground true to gage.

All genuine graphited "Oil-less  
Bearings" have always been  
made at Bound Brook, N. J., in  
the United States of America, by  
the

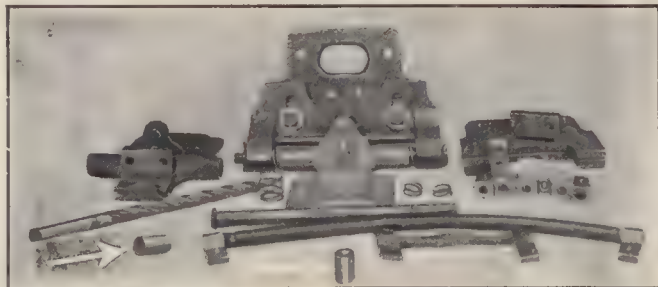


Trade Mark Reg. U. S. Pat. Office

## Bound Brook Oil-less Bearing Co.

Formerly Graphite Lubricating Co.



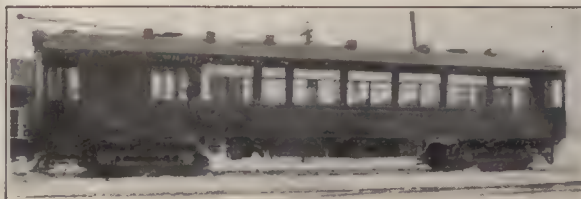


The Boyerized Bushings that have gone into the third-rail shoes of the new cars of the Wilkes-Barre & Hazleton Railway don't look very big or very important, but they'll have a lot to do with keeping out of the shop the collector shoes of this high-speed railway.

The associated Lehigh Traction Company, Hazleton, is another user of Boyerized products such as bushings for brake hangers and stock for brake pins.

To what extent have you Boyerized your equipment for longer life, greater safety, real economy?

## These Boyerized Bushings Are Worthy of this Splendid Car



## Bemis Car Truck Co.

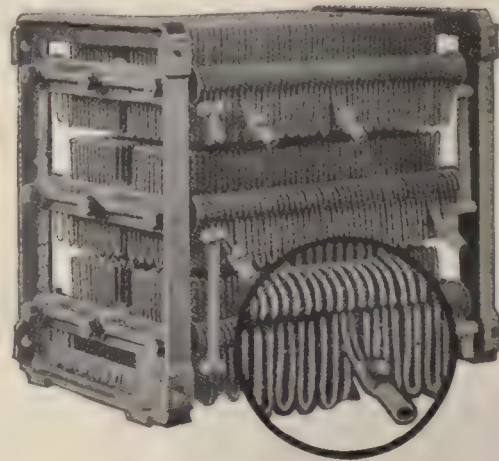
Makers of

Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
Case Hardened Bushings	Manganese Body Bushings
Case Hardened Nuts and Bolts	Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter.  
We carry 40 different sizes of case hardened pins in stock.  
Samples furnished. Write for full data.

Springfield, Mass.

## Overloads Have No Terrors for **EMB** Resistors



Because there are no thin spots to cause local fusing in EMB resistors. Absolute uniformity of cross-section of grids is assured by their method of manufacture. This uniformity of cross-section is maintained at all stages of

their service through reason of the grids being **drawn**. You can't say as much for cast grids.

Besides EMB Resistors are rust-proof, lighter in weight and well nigh indestructible.

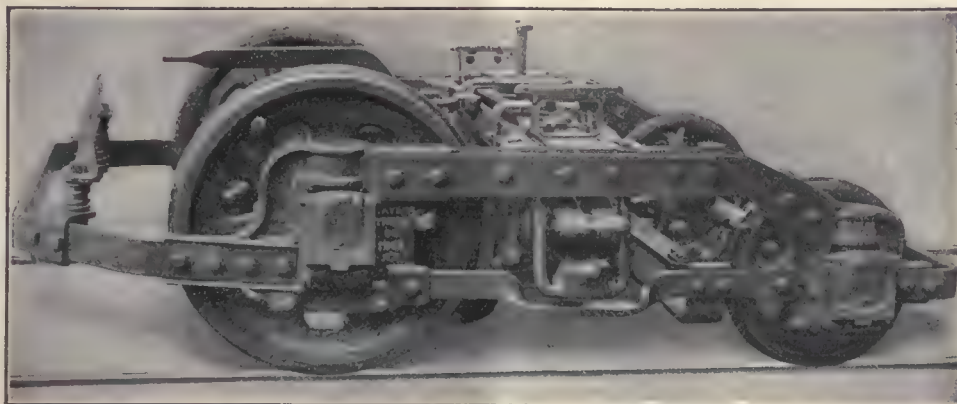
THE ELLCON COMPANY  
50 Church Street, New York

Write for  
data sheet  
to-day.

GREAT BRITAIN:  
Electro Mechanical Brake Co., Ltd., West Bromwich, Eng.  
AUSTRALIA:  
J. G. Lodge & Co., 109 Pitt Street, Sydney



## TAYLOR MAXIMUM TRACTION TRUCK



### 12 FACTS REGARDING "TAYLOR-MADE" TRUCKS

ABSOLUTELY SAFE  
RIDE LIKE PULLMANS  
SIMPLE IN CONSTRUCTION  
REDUCE WEAR OF MOTORS  
WILL INCREASE DIVIDENDS  
REDUCE COST OF MAINTENANCE

SAVE POWER  
SAVE ROAD BED  
LIGHT IN WEIGHT  
OVERCOME FLANGE WEAR  
BRAKES DO NOT CHATTER  
PREVENT SIDE OSCILLATION OF CARS

## TAYLOR ELECTRIC TRUCK CO.

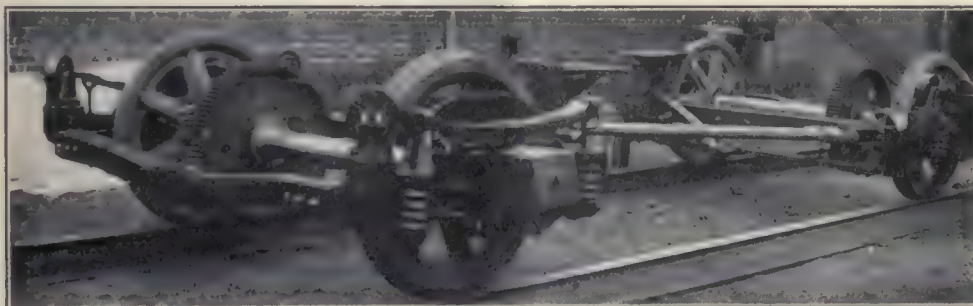
Established 1892

SPECIFICATIONS ON REQUEST

TROY, N. Y.

SEND FOR PORT-FOLIO

## Another Order for the Philadelphia Radial Truck



### BUILT FOR CORNING, N. Y. & PAINTED POST STREET RAILWAY CO.]

The wheelbase is 11 ft. 6 in., but it MIGHT HAVE BEEN 16 FT. FOR ALL WE CARE! This dimension is made always to suit the carbody, regardless of curve radii. That's how we can give you all the economies of the four-wheeled car combined with the riding qualities of the best double trucks.

NO NOSING

NO GALLOPING

Philadelphia Holding Company, 505 Chestnut St., Philadelphia, Pa.



*Reasons why you should use*

# GRIFFIN F. C. S. WHEELS

Less wearing away of metal of the flange.  
 Less chance for derailment at switch points and on curved worn rail because of freedom from sharp flanges.  
 Fewer stripped flanges because the flanges do not wear rapidly.  
 Less wearing away of metal at the gage of rail because the rubbing friction is at a minimum.  
 Less resistance to movement of the car.  
 Less resistance on curves.  
 Less power required for traction.  
 Less metal worn away from brake shoe per unit of work.  
 Less reduction in diameter per unit of service, therefore less labor in removing wheels to maintain the same diameter of wheel throughout the same car.

*Our Large Output Insures Prompt Deliveries*

## GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

FOUNDRIES

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OUR UP-TO-DATE EQUIPMENT  
 AND HIGH-CLASS WORKMANSHIP  
 ARE TURNING OUT  
**ALL-STEEL CARS**  
 OF THE MOST MODERN DESIGN  
**THE JEWETT CAR CO.**  
 NEWARK, OHIO



The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

# STANDARD STEEL WORKS CO.

Morris Building Philadelphia

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# Standard Steel Works Co.

Morris Building Philadelphia, Pa.



This man  
received an increase of  
30 per cent. in his salary

—because he had the business judgment  
to announce this want in the Searchlight  
of Electric Railway Journal.

POSITION wanted by young man with  
7 years' experience as armature winder  
and controller man. Best of references.  
Box Elec. Ry. Jour.

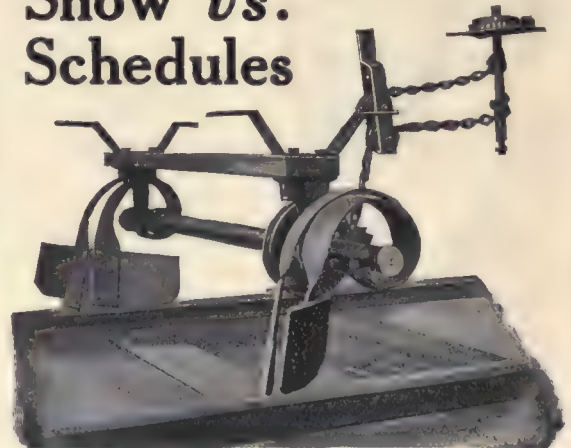
He writes:

"The result from my advertisement in  
the Electric Railway Journal was won-  
derful. I received 8 replies and accepted  
a new position with more than 30 per  
cent increase in salary."

His Ad. ran four times, at a cost of \$2  
Was it worth it?

Put your Wants in the Searchlight

# Snow vs. Schedules



You'll get unbroken schedules if you equip your  
cars with

# The Root Spring Scraper

Made in several sizes to fit any car. The spring  
principle enables the scraper to pass over all con-  
ditions of track, high centers, switches, frogs,  
crossings, etc. We have scrapers for heavy snow  
removal, light work, and every other kind of service.

Write to-day for our literature

Root Spring Scraper Co.  
Kalamazoo, Mich.



## THE LINDSLEY BROTHERS CO.

### Western "Good Poles Quick" Northern

Quick Shipments  
from our  
Minneapolis Yard

Minneapolis  
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Butt Treating  
Open Tank and  
"Hot and Cold" Processes

## MARSH & McLENNAN FIRE INSURANCE

Special Attention Given to Traction Insurance

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THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE

The Celebrated

### TRENTON TROLLEY WAGON

J. R. McCARDELL & CO.

Patentees and  
Sole Manufacturers

TRENTON, N. J.

Correspondence Solicited

It meets every  
requirement.



## Chapman

### Automatic Signals


Charles N. Wood Co., Boston



## POLES

NORTHERN WHITE CEDAR WESTERN RED CEDAR  
BUTT TREATING

**PAGE & HILL CO.**  
MINNEAPOLIS, MINN.

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**Grade One**  
LIQUID  
**Creosote Oil**

CUTS WOOD  
PRESERVING BILLS  
IN HALF

Write for booklet

The *Barrett* Company  
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### CEDAR POLES POSTS, TIES AND PILING

We use C-A-Wood-Preserver in Treating

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General Office: Minneapolis, Minn.

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## POLES WESTERN CEDAR PILING

We brag about the SERVICE we give

**B. J. CARNEY & CO.**

F. B. BRANDE, Manager  
819 Broad Street, Grinnell, Ia.

M. P. FLANNERY, Manager  
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Commit us to memory



### THE CARBOLINEUM FAMINE IS NOW PASSED

We can furnish 500,000 gallons and more  
It is made in America—by Americans, and for Americans.

It is "C-A-WOOD-PRESERVER" (Carbolineum-America)—the only Wood Preserver sold with a quality affidavit guaranteeing you superiority.

C-A-WOOD-PRESERVER COMPANY, Inc.  
St. Louis, Mo., 56 Liberty St., New York,  
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### FEDERAL SIGNAL CO.

Manufacturers Engineers Contractors	}	for	{	Automatic Signaling Interlocking	}	either	{	A.C. or D.C.
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No Interlocking Switches Are Safe Without  
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MAIN OFFICE and WORKS - - ALBANY, N. Y.

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## TREATED POLES, CROSS ARMS, TIES, TIMBERS, PAVING BLOCKS

CAPACITY 100,000,000 FEET B. M. PER ANNUM  
SEND FOR PAMPHLET

**International Creosoting & Construction Co.**

Address all communications to Office, Galveston, Texas  
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### Railroad and Tram Car Specialties

New inventions developed, perfected  
and worked for the English market

**Messrs. G. D. Peters & Co., Ltd.**

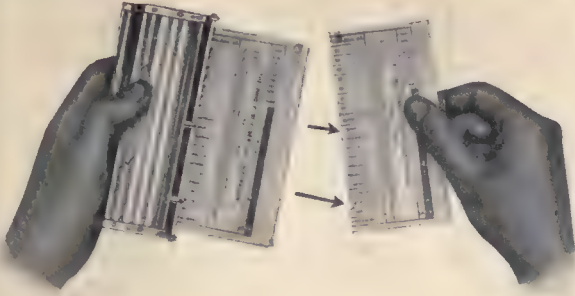
Moorgate Works, Moorfields, LONDON, E. C.

## TOOLS

for all classes of electrical construction and repair  
work. Write for catalog.

**Mathias Klein & Sons** Canal Station Chicago  
25





## "Lead me not into Temptation"

is the plea of the honest conductor. Answer that plea by doing away with the tempting *open* system of fare collection.

Answer it to your everlasting credit and profit by using for interurban and suburban fare collections the

## Macdonald Ticket Box

the box that closes the audit stub to the conductor. It gives no check to the conductor on the amount he is expected to turn in. It helps the honest conductor and shows up the dishonest one.

*Sample sent on request.*

**The Macdonald Ticket & Ticket Box Co.**  
Cleveland, Ohio

## KERITE

**T**HE use of Kerite is the logical result of experience.

The *increasing* use of Kerite is the logical result of an increasing appreciation of the sound policy of using nothing but the best.



**KERITE INSULATED WIRE & CABLE COMPANY**

NEW YORK

CHICAGO



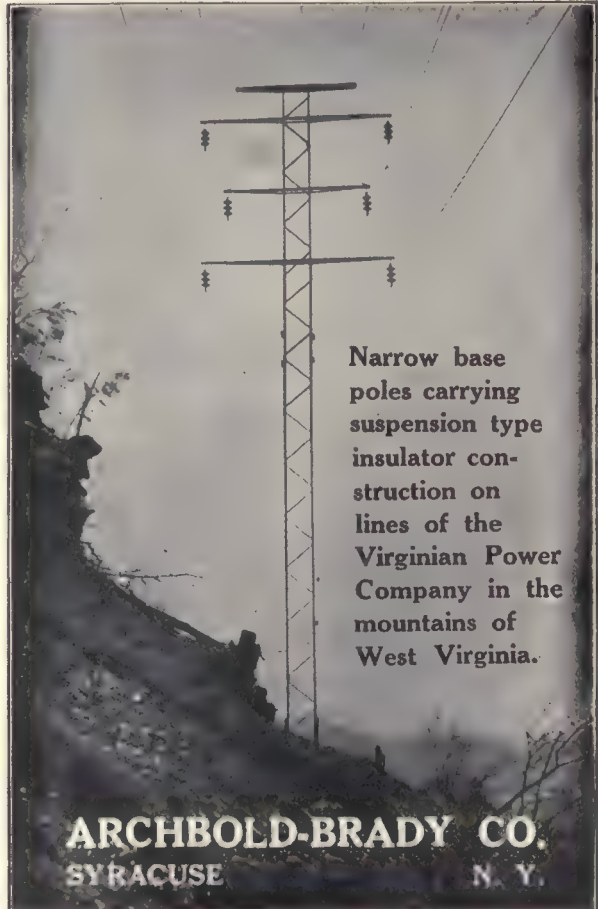
## EXPLOSIVES

**Reduce Maintenance Costs**

**F**OR building and maintaining your right of way, digging drainage ditches, erecting posts and poles for signal systems and excavations for station foundations, Du Pont Explosives are efficient, economic and practical aids to the construction crews.

Write for free instructive booklet: "Du Pont High Explosives."

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Powder Makers Since 1802  
Wilmington, Delaware



Narrow base poles carrying suspension type insulator construction on lines of the Virginian Power Company in the mountains of West Virginia.

**ARCHBOLD-BRADY CO.**  
SYRACUSE N. Y.



# STEEL POLES



Bates Steel Poles in use by the  
DES MOINES CITY RAILWAY  
DES MOINES, IOWA, U.S.A.

Best steel pole in the world for electric railway trolley service, **STRONGEST, LIGHTEST, MOST ARTISTIC, LOWEST IN PRICE, QUICKEST DELIVERIES.**

**A full line of convenient Malleable Fittings**

Our Steel Pole TREATISE tells a big story—Ask for it.  
We make steel poles for every pole purpose.

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# ALUMINUM Railway Feeders

And all kinds of **Electrical Conductors**

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information

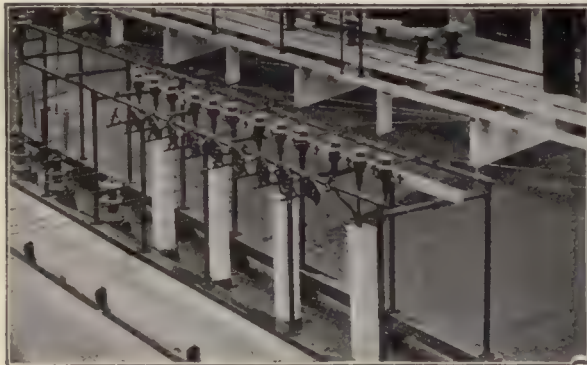
**Aluminum Company of America**  
Pittsburgh, Pa.



# ELECTRICAL WIRES AND CABLES

of every description for  
all electrical purposes.

**John A. Roebling's Sons Company**  
TRENTON, N. J.



## An Interesting Installation of D. O. A. Terminals

The illustration shows how STANDARD D. O. A. (Davis Open Air) Cable Terminals are used to effect a convenient and economical entrance of aerial lines through the roof of a power house. Single conductor 15,000-volt terminals are shown with stubs of lead-covered cable attached.

*For further information write our nearest office.*

**Standard Underground Cable Company**  
Pittsburgh, Pa.

New York      Philadelphia      Chicago  
Boston      San Francisco      St. Louis

For Canada: Standard Underground Cable Co., of Canada,  
Limited, Hamilton, Ont.

AWARDED

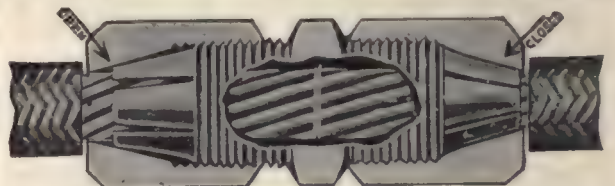


# American Rail Bonds

**Crown  
United States  
Twin Terminal  
Soldered**

**American Steel & Wire Company**  
Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York  
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San Francisco      Los Angeles      Portland      Seattle



## CUTTING CABLE SPLICING COSTS

It takes skill—highly paid skill—to solder a cable splice. But

## Frankel Solderless Connectors

Patented Feb. 16, 1907; July 30, 1907; May 28, 1908

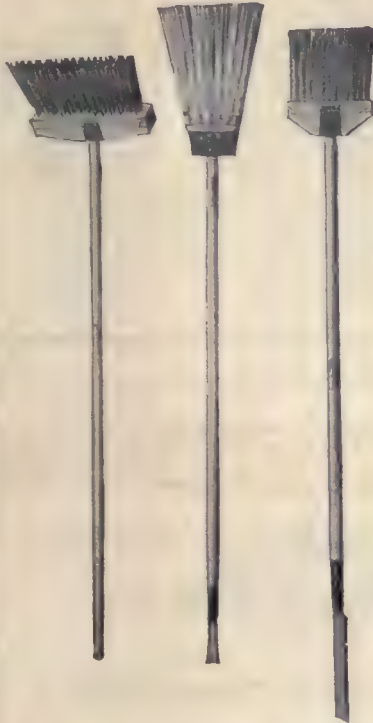


can be applied perfectly by untrained workers. You save the wage difference and get a safer and better splice.

Factory: 177-179 Hudson St., N. Y.  
Sales Rooms: 733-735 Broadway



## A Great Combination



No. 1 to sweep crossings.

No. 2 to handle light dirt and snow in the frogs, switches, and curves.

No. 3 to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

No. 1 and No. 3 contain Flat Steel Tempered Wire, and nothing superior can be produced. Serviceable all the year round. Your road is not complete without them.

Write for Prices.

**J. W. PAXSON CO., Mfrs.**  
1021 N. Delaware Ave., Philadelphia, Pa.

This mark means **99.90% pure iron**



Every section of our "ACME" (Nestable) Corrugated Anti-Corrosive NO-CO-RO METAL Culverts is stenciled as shown above.

"NO-CO-RO" has been the exclusive trade-mark on Corrugated Culverts manufactured by The Canton Culvert & Silo Company for years past, as users and all others familiar with "ACME" Culverts know.

The NO-CO-RO METAL brand means Iron guaranteed (by surety bond if desired) to analyze 99.90% pure—i. e., not to contain more than .10% (10/100 of 1%) in the aggregate of carbon, manganese, phosphorus, sulphur and silicon, and it is of uniform and homogeneous composition—an exceptional rust-resisting culvert material.

When you insist on NO-CO-RO METAL you get the highest purity iron obtainable in any Corrugated Culvert construction.

Our Catalog G-3 tells you all about it.

**THE CANTON CULVERT & SILO CO.**  
MANUFACTURERS  
CANTON, OHIO, U.S.A.

## An Assurance of Uninterrupted Service

is best secured by a careful selection of the transmission line insulators. It is here that breakdowns are most likely to occur.

### Hemingray Insulators

by reason of their continued use on important transmission lines have demonstrated the soundness of Hemingray design. The teats on the petticoat attract water on the outer and inner surfaces into drops—preventing the creeping of moisture on insulators and pins. The line is complete and the catalog shows it. Have you a copy?

### Hemingray Glass Company

Established 1848 }  
Incorporated 1870 } Covington, Ky.

Factories: MUNCIE, INDIANA



No. 72—10000 Volts



No. 20—5000 Volts



"WHALEBONE"

## Fibre Track Insulation

DIAMOND STATE FIBRE CO.

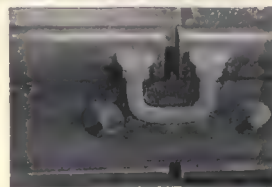
Flismere, Del. Bridgeport, Penna. Chicago, Ill.

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Insure uniform superheat at temperature specified

### Power Specialty Company

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How Many Miles  
of Track Have  
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Whether you have many or few the LINCOLN BONDING SYSTEM is the economical bonding system for you. If you would know why see our advertisement on page 16 of the August 26, 1916, issue of Electric Railway Journal.

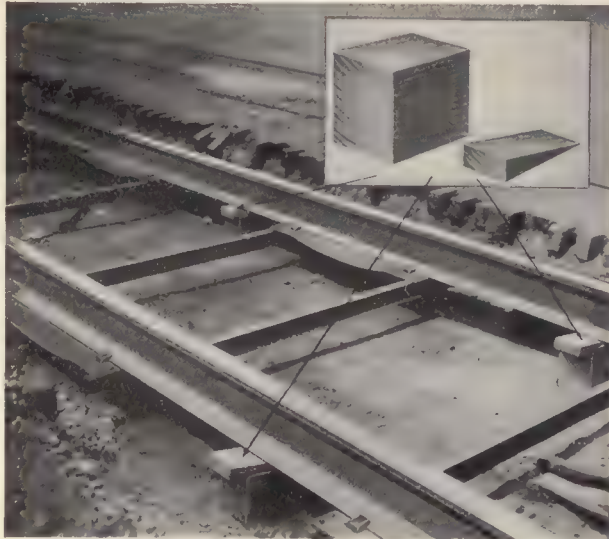
### THE LINCOLN BONDING CO.

636 Huron Rd.

CLEVELAND, OHIO

Agents: Lewis & Roth Company, 312 Denckla Bldg., Philadelphia, Pa.; Charles N. Wood Company, 79 Milk St., Boston, Mass.





**W**HO pays for the time your men spend whittling out wedges? Why not furnish them with material all ready to apply—as you *can*, by using

## “S-A” BLOCKS AND WEDGES FOR TRACK LEVELING

It will mean a better job, more speed, and a big saving of money for you. Thousands in use by prominent companies. Write for estimate, stating quantity required per year; no obligation to you.

**THE STEELE-ALDERFER COMPANY**

JUNCTION STATION,

Cuyahoga Falls, Ohio

Near Akron

## The Acetylene Blow Torch Prest-O-Torch

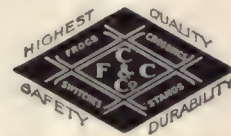
**Quicker and cheaper  
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For factories, repair shops, linemen, dentists, jewelers, the Prest-O-Torch saves time and money. Used with Prest-O-Lite Tanks—ready made gas. Intense, concentrated flame instantly lighted. No depreciation, safe and convenient. Style “A,” price, 75c (Canada, 85c) will braze up to  $\frac{3}{8}$  inch round rod. Style “C” for heavier work, \$2.25 (Canada, \$2.75). Special styles for dentists. Write for literature or send order now. Money refunded if not satisfied.

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TRACK SPECIAL WORK



**WE MAKE THIS GRADE ONLY**

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CLEVELAND, OHIO

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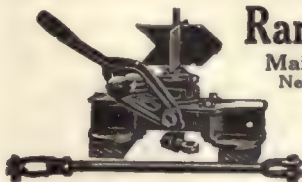
Hoboken, N. J.



**Special Track Work**

**Manganese Steel and Hard Center Frogs**

**Switches      Mates      Crossings**

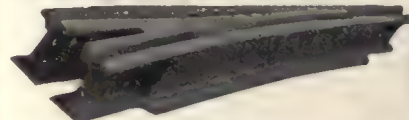


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Automatic Switch Stands,  
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### Manganese Steel Track Work



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LARGEST LAYOUT  
TO THE  
SMALLEST INSERT  
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**SPECIAL TRACK WORK  
For ELECTRIC RAILWAYS  
THE AMERICAN FROG AND SWITCH CO.  
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Best in  
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The engineer who uses it in his boilers will never be exposed to the attacks of scale and its allies, bagging, pitting and corrosion.

DEARBORN TREATMENT removes and prevents scale formation, and overcomes all pitting and corrosive action of the water. Each case is given individual attention. Send us a gallon sample of your boiler water supply for analysis, and we will advise regarding your needs. No charge for this service.

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Steam Superheaters                      Mechanical Stokers

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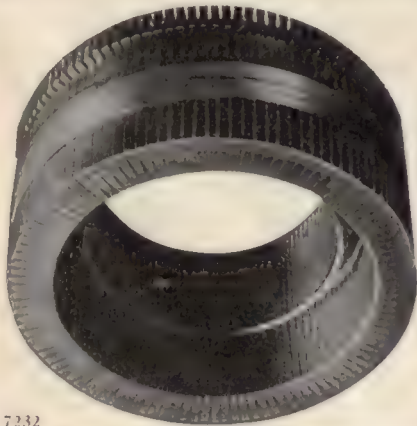
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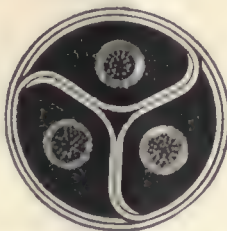
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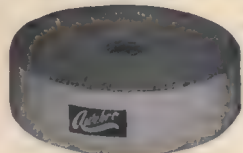
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used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

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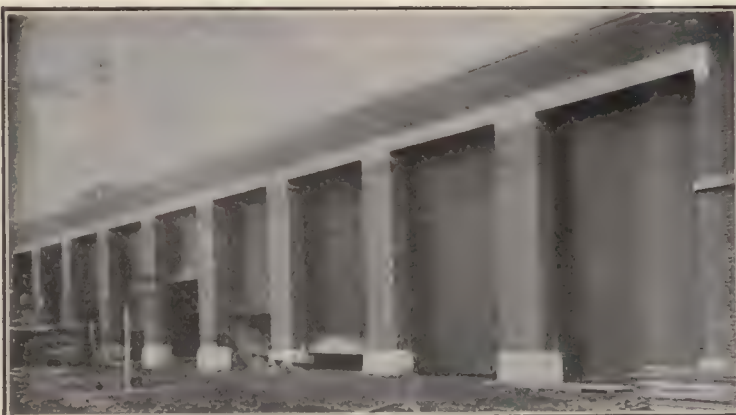
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The pole cannot fly up again after

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Install the "Ideal" Catcher on all your cars, and assure long life for your overhead.

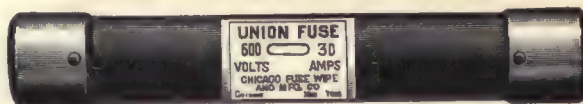
It's almost absolutely trouble-proof—too. If the rope should break, the conductor can have the catcher back in service in 5 minutes.

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 and thus make sure you are getting the best.

The mark of  
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It protects the  
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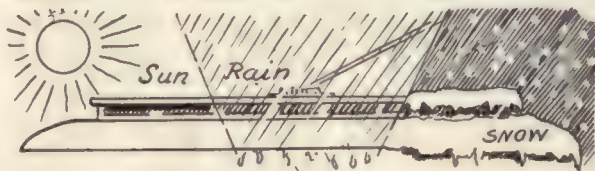


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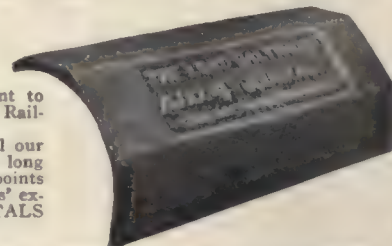
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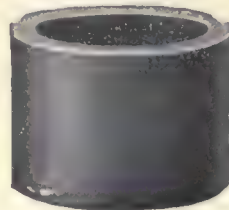
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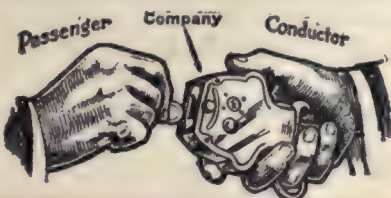
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Electric Railway Journal

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1—500 KW. 1500 Volt Commutating Pole, Compensated type, Westinghouse Direct Current Generator, connected through a 3600 to 900 R.P.M. Reduction Gear to a 625 K W Combination, Impulse and Reaction Westinghouse Parsons Steam Turbine designed for condensing service.

This Unit is complete with Expansion Joint, Exhaust Gate Valve, Atmospheric Relief Valve, and a 3 panel Switchboard. It is new, having never been used, and is in first-class operating condition.

For particulars as to specifications and price, communicate with C. F. Hopkins, Vice President and General Manager of the Sapulpa & Oil Field Railroad, Tulsa, Oklahoma.

## Rotary Converter Wanted At Once.

300 to 600 kw., three or six phase; 25 cycle; 600 volts D.C. converter. A 400 kw. unit preferred. Three phase transformer or single phase transformers, 13,200 volts on primary side to go with the rotary. Oil-insulated, self-cooled, three phase transformer preferred. Starting panel and switchboard with equipment desired.

Would like to get in touch with anyone having part of or all of such equipment for sale or for lease for a period of nine months.

Give full particulars of make, time in service, machine numbers, location and price.

**Walter C. Slade, Supt. Power and Lines**  
The Rhode Island Company, Providence, R. I.

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

Get Your Wants into the Searchlight



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## MACGOVERN & COMPANY, Inc.

FRANK MACGOVERN, Pres. & Gen. Mgr.

114 LIBERTY STREET

NEW YORK CITY

## Steam and Electrical Machinery

Air Compressors, Pumps, Hoists, etc.

## ARCHER & BALDWIN

114-118 Liberty Street

New York City

TELEPHONE 4337-4338 RECTOR

Rotary Converters, 25 Cycle

4-150 K.W. General Electric type T.C., 4-150-750, 25 cycle, 3 phase, 575 volt rotary converters, 750 RPM., complete with 8-60 K.W. General Electric type H., 25 cy., 380-13200 volt, oil cooled single phase transformers.

Rotary Converters, 60 Cycle

2-150 K.W. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 RPM., complete with 4-100 K.W. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

Above will be sold with or without transformers.

Railway Motors

4-75 to 90 H.P. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

IMMEDIATE DELIVERY

## Technical Men Want Facts

Journal advertisers who present facts  
see ample evidence that their  
advertisements are read.

## NEW TOOL STEEL, GEARS and PINIONS FOR SALE

8—G.E. 73-C Gears 64 Teeth 6" Bore, split.  
18—G.E. 73-C Pinions 21 Teeth.  
28—West No. 112 Gears 67 teeth 5" Bore, Split.  
30—West No. 112 Pinions 22 teeth.  
For further information apply

Storekeeper, TORONTO & YORK Radial  
TORONTO, CANADA

## FOR SALE

### Machinery For Sale

The following three phase, 60 cycle horizontal Curtiss turbines and other apparatus will be available for deliveries as stated: 1000 kw. turbine, 1800 r.p.m. 4500 volts, with Worthington surface condenser and auxiliaries. Can be reconnected for 2300 volts. Delivery in September:—2000 kw. turbine, 1800 r.p.m., 2300 volts (new) December delivery. Box 1168, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.



### Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.  
New Haven, Conn.

## POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

CHIEF electrician of 20 years' experience wants a job. Anything considered. Box 1163, Elec. Ry. Jour.

ENGINEER—46, thoroughly experienced in electric railway operation and construction, will be open for an engagement September 1st. Has made specialty of overhead line and power station construction and operation. Will go anywhere. Correspondence solicited. Box 1144, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

ENGINEER desires change, 3 years in present position as chief for city railway, 9 years' experience in central and substation construction and operation. References including present employer. Box 1155, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

ENGINEER desires change, at present maintenance of way engineer of 165 mile railway. Technical graduate and six (6) years' experience in street railway operation. References furnished upon request. Box 1176, Elec. Ry. Jour.

HIGH-GRADE man wants position as assistant to busy executive. Fifteen years' experience steam and electric railway work. Thoroughly trained in organization and economical management of various departments. Fully qualified in train operation under standard rules, employment and discipline of trainmen and determination of schedules. Now operating official of city and interurban system. Age 37, married and in good health. No preference as to location. Box 1116, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

IS your "maintenance of equipment" account running high? Possibly your shops need reorganizing. An expert who can guarantee results solicits the job. Box 1138, Elec. Ry. Jour.

MANAGER in small city wishes a change. Large experience in railway and lighting business. Upbuilding and efficiency work a specialty. Box 1174, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

MASTER mechanic, 9 years' practical and technical experience on installation maintenance. Married, age 29 years, good morals. Box 1169, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

STREET railway superintendent wishes to make a change. Have had 20 years' experience in all branches. Box 1165, Elec. Ry. Jour.

## POSITIONS WANTED

POSITION wanted by man with 15 years' experience as roadmaster and engineer of way and structure with a large Eastern road. Can give good references. Box 1177, Elec. Ry. Jour.

PURCHASING agent with fifteen years' experience in street railway and central station buying, also storekeeper experience, can furnish good reference for executive and ability. Box 1148, Elec. Ry. Jour.

### Assistant to Executive

High grade man with practical experience in transportation, rolling stock and shops, power and maintenance of way departments, seeks connection with traction system. Close student of statistics and economics. Engineering education, age 33. Box 1173, Elec. Ry. Jour.

## POSITIONS VACANT

AUDITOR for car plant, building all kinds of steel and wooden cars for domestic and export use. Man required must have thorough knowledge of accounting and cost work on car construction. No other need apply. Good position and salary for man possessing these qualifications. Plant ideally located. Applications will be privately examined by financial officer and treated as extremely confidential. Box 1170, Elec. Ry. Jour.

MAINTENANCE man wanted by a growing company in North Carolina, a man competent to maintain equipment including armature winding for road operating four cars. One with some knowledge of track maintenance preferred, good opportunity for advancement in lighting and power department. Give references, salary expected, and other particulars in first letter. Box 1153, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

WORKING foreman wanted for car shop. One who can do car wiring and other general repairs. A good position for a hustler. Give references and state salary expected. Box 1149, Elec. Ry. Jour.

## AGENTS AND SALESMEN

## SALESMAN

TECHNICAL MAN WANTS TO HANDLE ON COMMISSION A GENERAL LINE OF STREET RAILWAY SUPPLIES IN THIS TERRITORY. RESPONSIBLE; BANK REFERENCES.

J. L. MORGAN, Kansas City Life Bldg.  
Kansas City, Mo.

## PRACTICALLY NEW

2,200 tons 60-lb. A. S. C. E. Steel

# RAILS

The Best We Ever Handled

ZELNICKER IN ST. LOUIS

423 1st Nat. Bank Bldg. Chicago  
910 Hennen Bldg. New Orleans

## BUSINESS OPPORTUNITIES

### Good Investment Wanted

Corporation in good standing is looking for an investment to develop or acquire Traction Light and Power properties. All communications treated in strict confidence. Submit details to Box 1167, Elec. Ry. Jour.



# READY - REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

**Acetylene Apparatus.** (See Cutting Apparatus, Oxy-Acetylene.)

**Acetylene Service.**  
Oxweld Acetylene Co.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Alloys, Steel & Iron.**  
Titanium Alloy Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Anchor, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Armature Shafts.**  
Valley Steel Co.

**Automobiles and Busses.**  
Brill Co., The J. G.  
White Co., The.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Taylor Elect. Truck Co.  
U. S. Metal & Mfg. Co.  
Valley Steel Co.  
Westinghouse Elec. & M. Co.

**Babbling Devices.**  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
American Railway Supply Co.  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.  
Woodman Mfg. & Sup. Co., R.

**Bankers and Brokers.**  
Coal & Iron National Bank.  
Halsey & Co., N. W.  
Redmond & Co.

**Batteries, Dry.**  
Johns-Manville Co., H. W.  
Western Electric Co.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings and Bearing Metals.**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
More-Jones Brass & M. Co.  
St. Louis Car Co.  
Taylor Elect. Truck Co.  
Westinghouse Elec. & M. Co.

**Bearings, Oilers, Graphite Bronze & Wood.**  
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**  
Guerny Ball Bearing Co.  
Railway Roller Bearing Co.

**Bearings, Roller Side.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.  
Watson-Stillman Co.

**Blasting Powder & Equipment.**  
Du Pont, De Nemours & Co., E. I.

**Blow Torches for Soldering and Brazing.** (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Boiler Coverings.**  
Johns-Manville Co., H. W.

**Boiler Graphite.**  
Dixon Crucible Co., Joseph.

**Boilers.**  
Babcock & Wilcox Co.

**Bond Clips.**  
Electric Railway Improv. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improv. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improv. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improv. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Roebing's Sons Co., John A.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Bonds, Welded.**  
Lincoln Bonding Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms.** (See also Poles, Ties, Posts, Piling and Lumber.)  
American Bridge Co.  
Bates Expanded Steel Truss Co.  
Craghead Engineering Co.  
Electric Ry. Equipment Co.  
Electric Service Supplies Co.  
International Creol. & C. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Western Electric Co.

**Brake Adjusters.**  
Johns-Manville Co., H. W.  
Barbour-Stockwell Co.  
Kerschner Co., Inc., W. R.  
Smith-Ward Brake Co.

**Brake Shoes.**  
American Brake S. & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
Taylor Elect. Truck Co.  
Wheel Truing Brake Shoe Co.

**Brakes, Brake Systems and Brake Parts.**  
Ackley Co., G.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
British Westinghouse Elect. & Mfg. Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Taylor Elect. Truck Co.  
Westinghouse Trac. Brake Co.

**Brazing.** (See Welding.)

**Bridges & Buildings.**  
American Bridge Co.

**Brooms, Track, Steel or Rattan.**  
Paxson Co., J. W.  
Western Electric Co.

**Brushes, Carbon.**  
Calebough Self - Lubricating Carbon Co.  
Dixon Crucible Co., Joseph.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Speer Carbon Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Brush Holders.**  
Anderson Mfg. Co., A. & J. M.

**Bumpers, Car Seat.**  
Electric Service Supplies Co.

**Bunkers, Coal.**  
American Bridge Co.

**Bunting.**  
Boyle & Co., Inc., John.

**Bushings, Fibre.**  
Diamond State Fibre Co.

**Bushings, Graphite & Wooden.**  
Bound Brook Oil-less Bearing Co.

**Bushings, Case Hardened Mangane.**  
Bemis Car Truck Co.

**Buttons.** (See Badges and Buttons.)

**Cables.** (See Wires and Cables.)

**Carbon Brushes.** (See Brushes, Carbon.)

**Car Equipment.** (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

**Car Trimmings.** (For Curtains, Doors, Seals, etc., see those Headings.)

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
United Electric Car Co., Ltd.  
Wason Mfg. Co.

**Cars, Self-Propelled.**  
British Westinghouse Elect. & Mfg. Co.  
Electric Storage Battery Co.  
General Electric Co.

**Carts, Dump.**  
Differential Car Co.

**Castings, Brass.**  
Frankel Connector Co.  
More-Jones Brass & M. Co.

**Castings, Composition or Copper.**  
Anderson M. Co., A. & J. M.

**Castings, Gray Iron and Steel.**  
American B. S. & Fdy. Co.  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
St. Louis Steel Fdry.  
Standard Steel Works Co.  
Union Springs & Mfg. Co.

**Castings, Malleable and Brass.**  
American Brake S. & Fdy. Co.  
Bemis Car Truck Co.  
Long Co., E. G.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**  
Electric Service Supplies Co.  
Earl, C. I.  
Holden & White.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Wood Co., C. N.

**Ceiling, Car.**  
Keyes Products Co.  
Pantastote Co., The.

**Chargers, Storage Battery.**  
General Electric Co.

**Checks, Employees.**  
American Railway Supply Co.

**Cheese Cloth.**  
Boyle & Co., Inc., John.

**Chemists.**  
Little, Arthur D., Inc.

**Circuit Breakers.**  
Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Clamps.**  
Frankel Connector Co.

**Clamps and Connectors, for Wires and Cables.**  
Anderson M. Co., A. & J. M.  
Dossert & Co.  
Electric Service Supplies Co.  
Electrical Engineers' Equipment Co.  
General Electric Co.  
Klein & Sons, M.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.** (See also Snow-Plows, Sweepers and Brooms.)  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Western Electric Co.

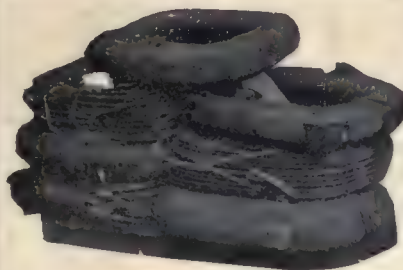
**Cleats, Car Wiring.**  
General Electric Co.

**Clusters and Sockets.**  
General Electric Co.

**Coal and Ash Handling.** (See Conveying and Hoisting Machinery.)

**Coil Banding and Winding Machines.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
Western Electric Co.





## Make These Pay Dividends

To declare dividends a railway must not only make money—it must save money.

## Independent Treatment of Old Field Coils

offers you a good opportunity to save money.

You pay us the trifling cost of the insulation and we'll return to you for every old coil a coil equal to and in most cases better than a new coil. A coil that reflects skilled labor, up-to-date equipment and that degree of perfection that only comes through doing one thing for ever so long and doing it well.

And don't forget the insulation we use is Salamander Pure Asbestos—a guarantee of long life and dielectric strength.

*Correspondence Solicited*

### Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York      FACTORIES: York, Pa., and Weehawken, N. J.

# Weston

Model 1

## D. C. Portable Voltmeters

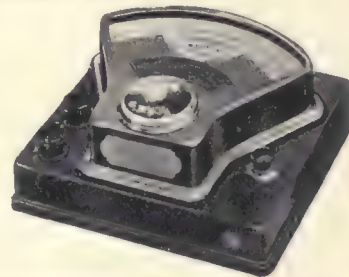
They are guaranteed to an accuracy of 1/5 of one per cent (in terms of full scale length). They are dead-beat. Each scale is hand-calibrated and has a mirror over which the knife-edge pointer travels. By bringing the pointed tip into line with its image, readings may be made within 1/10 of a division at any part of the scale. In mechanical and electrical workmanship, these Voltmeters practically attain perfection. In external appearance they are very handsome. The metal case has an exceedingly durable royal copper finish. The base is of selected mahogany, highly polished.

A full description of Model 1 Voltmeters will be found in Bulletin No. 501, which will be mailed on request.

**Weston Electrical Instrument Co.**

21 Weston Ave., Newark, N. J.

New York  
Chicago  
Boston  
Philadelphia  
St. Louis  
Buffalo  
Detroit  
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Richmond  
Cincinnati  
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## VAN DORN COUPLER

for every condition and every requirement.  
*Send for information and blueprints.*

**VAN DORN COUPLER CO.,**

2325 So. Paulina St.

Chicago, Ill.



"Trade Mark Reg. U. S. Pat. Off."

### Samson Spot Waterproofed Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

**SAMSON CORDAGE WORKS, BOSTON, MASS.**

### ELECTRIC RAILWAY DEVICES

High Power Compact Hand Brakes, Gear or Differential Types.  
Sterling Light Weight Boiler Bearing Trolley Bases.  
Screenless Air Cleaners for Compressors.  
Sterling Sand Boxes.  
Berg Fenders and Wheel Guards.



Multi-Vapo-Gap Lightning Arresters and Hydrogrounds.  
Trigger Lock Reversible Controller Fingers.  
"Q-P" Trolley Catchers.  
Soldered Rail Bonds.  
Friction and Insulating Tapes.  
Sterling Ticket Punches.  
Controller Handles.

**LORD MFG. CO.,**  
105 W. 40th St., New York

## U. S. Metal & Mfg. Co.

165 BROADWAY,

NEW YORK CITY

Chicago

Washington, D. C.

## RAILWAY SUPPLIES

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Tool Steel Gears and Pinions

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Chillingworth Seamless Gear Cases

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Johnson Fare Box Co.  
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Holden & White

General Agents for Anglo-American Varnish Co.

Eastern Agents for Union Fibre Co.

Southern and New England Agents for Thayer & Co.

When writing to Advertisers in this publication you will confer a favor on both publisher and advertiser by mentioning the

**Electric Railway Journal**



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

- Coils, Armature and Field.**  
Cleveland Armature Works.  
Coil Mfg. & Repair Co.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Roebbling's Sons Co., John A.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
- Coils, Choke and Kicking.**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Coin-Counting Machines.**  
Electric Service Supplies Co.  
International Register Co., The  
Johnson Fare Box Co.
- Commutator Slotters.**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.  
Wood Co., C. N.
- Commutator Truing Devices.**  
General Electric Co.
- Commutators or Parts.**  
Cleveland Armature Works.  
Cameron Electrical Mfg. Co.  
Coil Mfg. & Repair Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Long Co., E. G.  
Mica Insulator Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
- Compressors, Air.**  
Curtis & Co. Mfg. Co.  
General Electric Co.  
Westinghouse Trac. Brake Co.
- Condensers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Conduits, Flexible.**  
Tubular Woven Fabric Co.
- Conduits, Underground.**  
Johns-Manville Co., H. W.  
Western Electric Co.
- Connectors, Solderless.**  
Frankel Connector Co.
- Controller Fingers.**  
Lord Mfg. Co.
- Controller Handles.**  
Lord Mfg. Co.
- Controller Regulators.**  
Electric Service Supplies Co.
- Controllers or Parts.**  
British Westinghouse Elec. & Mfg. Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.
- Controlling Systems.**  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Converters, Rotary.**  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
- Conveying and Hoisting Machinery.**  
American Bridge Co.  
Green Eng'g Co.
- Cord, Bell, Trolley, Register, etc.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Long Co., E. G.  
Roebbling's Sons Co., John A.  
Samson Cordage Works.
- Cord Connectors and Couplers.**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., C. N.
- Cotton Duck.**  
Boyle & Co., Inc., John.
- Couplers, Car.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Long Co., E. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. Brake Co.
- Cranes. (See also Hoists.)**  
Niles-Bement-Pond Co.
- Creosoting. (See Wood Preservatives.)**
- Cross Arms. (See Brackets.)**
- Crossing Foundations.**  
International Steel Tie Co., The.
- Crossing Signals. (See Signals, Crossing.)**
- Crossings, Track. (See Track, Special Work.)**
- Culverts.**  
American Rolling Mill Co.  
Bark River B. & Culvert Co.  
California Cor. Culvert Co.  
Canton Culvert & Silo Co.  
Coast Culvert & Flume Co.  
Corrugated Culvert Co.  
Delaware Metal Culvert Co.  
Dixie Culvert & Metal Co.  
Hardesty Mfg. Co., R.  
Illinois Corrugated Metal Co.  
Independence Co. Culvert Co.  
Iowa Pure Iron Culvert Co.  
Kentucky Culvert Mfg. Co.  
Lee-Arnett Co.  
Lone Star Culvert Co.  
Lyle Corrugated Culvert Co.  
Michigan Bridge & Pipe Co.  
Montana Culvert Co.  
Nebraska Culvert & Mfg. Co.  
Nevada Metal Mfg. Co.  
New England Metal Cul. Co.  
North East Metal Co.  
Northwestern Sheet & I. Wks.  
O'Neill Co., W. Q.  
Ohio Corrugated Culvert Co.  
Pennsylvania Metal Cul. Co.  
Road Supply & Metal Co.  
Stoux Falls Metal Cul. Co.  
Spencer, J. N.  
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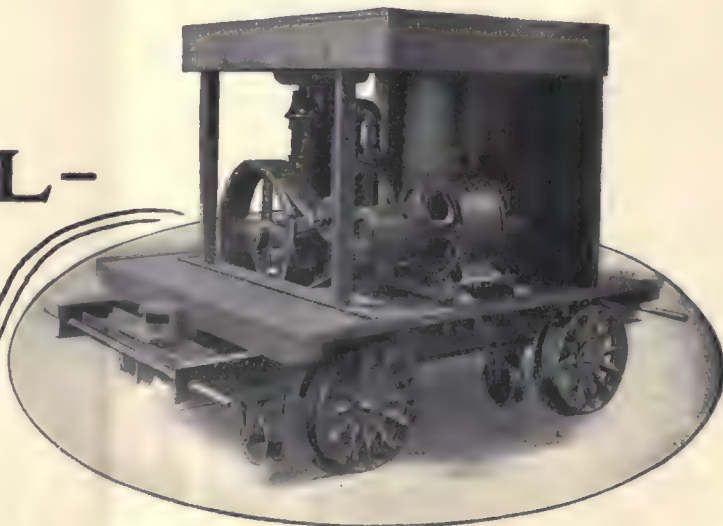
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is the expression that takes the place of a Klaxon horn as you donkey-ride through the bazaars of Cairo.

The natives that crowd the streets are slow thinking and slow moving and unless they are ouahed out of the road the donkey's head is apt to collide with them and produce a flow of Arabic not taught in the language schools.

OUAH! properly articulated, wakes them up and produces action.

Would that someone would invent such a stimulator for those who buy any old carbon brush at any old price and fall asleep to the fact that the hap-hazard chosen brush is scratching the life out of the commutator and commutation.

—Who remain asleep to the fact that a Morgan brush engineer would study their requirements and prescribe a Morganite brush to give A1 commutation and save money per year of service over the cheapest brush made—

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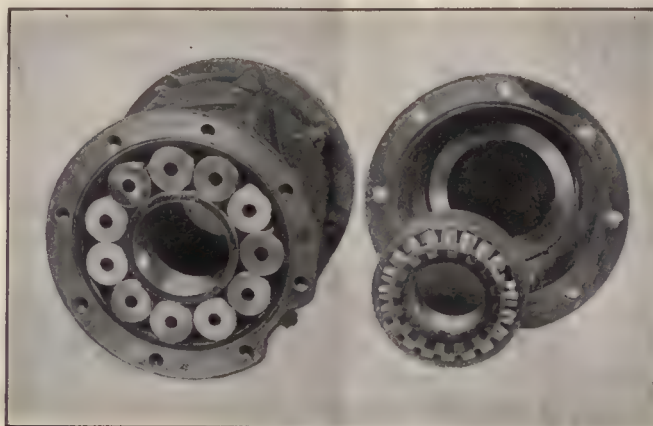
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PARTS OF ROLLWAY BEARING

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### Rollway Bearings

it applied the deadly parallel between a Rollway Bearing car and a plain bearing car of the same weight (70,000 lb.) on the same schedule. Here is the parallel for

ENERGY AND LUBRICATION COSTS		
	Plain Bearings	Roller Bearings
Annual mileage .....	103,446	103,446
Energy consumption, kilowatt-hours .....	372,405	327,717
Energy cost, at 1 cent per kilowatt-hour .....	\$3,724.05	\$3,277.17
Cost of oil .....	10.35	1.04
Cost of waste .....	4.14	....
Cost of rebabbiting, labor and material .....	10.36	....
Cost of labor for oiling .....	8.27	0.52
Cost of labor replacing oil every 1000 miles ..	3.11	....
Total annual cost .....	\$3,760.28	\$3,278.73
Difference in annual saving, \$481.45 or 12.8 per cent.		

The saving in one year was \$481.45; the cost of the Rollway Bearings was only \$434.00.

*Think it over !*



The Railway Roller Bearing Co.  
SYRACUSE, N. Y.



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**F**OR over twenty years the 21-E Truck has not been changed in any essential feature, and, in spite of being operated on more electric railways at home and abroad than any other one type, remains the same today as when first introduced. A unique history. The two features that have been added during all these years, while not essential to safe operation and easy riding, are very marked improvements—the Brill Half-Ball Brake Hanger and the Brill Wide-Wing Journal Box.

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# The San Bernadino Limited

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For this service, the Pacific Electric railway selected G-E 254, 600/1200 Volt Ventilated Railway Motors and G-E Multiple Unit Control.

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Handling Track Work in Kansas City

# ELECTRIC RAILWAY JOURNAL

New York, September 9, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 11 10c a copy



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the Service of Third Avenue Railway New York

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## *Standards*

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“I know—you know—in fact, everybody knows—that so many types and styles of cars, motors, etc., increase costs.”

“You are absolutely right, Boss,” answered Joe, “I expect to attend all the engineering association meetings at the convention, and you may depend upon my doing my share.”

NOTE—All the “Joes” and all the “General Managers” who are fortunate enough to attend the coming convention will have an opportunity to see the excellent display of modern Westinghouse Railway Motors that are destined to become the **Standard of the Country**, the same as HL Control.

**Westinghouse Electric & Manufacturing Co.**

Sales Offices in All  
Large American Cities



East Pittsburgh  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

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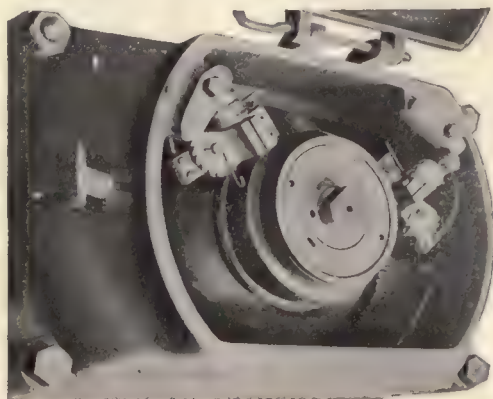
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Circulation of this issue 7200 copies



## "Bungalow" type of Westinghouse Air Compressors



### Brush Holders

—Are permanently located slightly back of neutral position, the most efficient one, since armature rotates in one direction only.

—Are located in lower quadrants, making accessibility easy from the pit. Brushes and holders tend to keep themselves clean.

—Are fastened to motor case with one tap screw and one dowel pin, making removal exceptionally easy.

### Brush Holder Springs

—Are a combination coil and flat spring, which gives double amplitude, takes care of very small vibrations, eliminates chattering, and improves commutation.

—May be given any tension desired by moving the wire lever on the notched dial.

—Provides resting place for flat end of spring while brushes are being taken out.

—Are adjusted without removing and without use of tools.



*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

**General Offices: Wilmerding, Pa.**

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



NEW YORK:

City Investing Building

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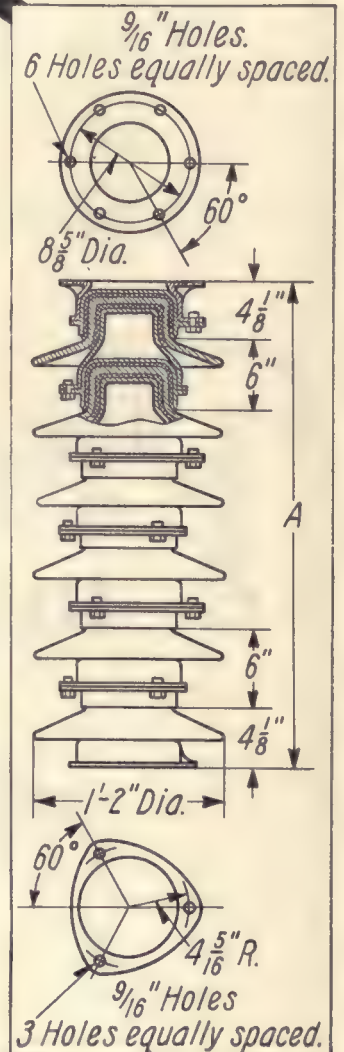


# Westinghouse

## Pillar Insulators

Made in units bolted together to make up an insulator for any voltage. The units are built up on 6-inch centers, each unit adding six inches to the height of the insulator. The porcelain insulator is provided with a cemented-on cap, and a cemented-in hollow pin, 4 inches in diameter. The caps and pins are each provided with three lugs that fit together and are secured with  $\frac{1}{2}$ -inch machine bolts. A wrench is the only tool required to remove and replace any section. No adjustment is necessary. Westinghouse Pillar Insulators are suitable for both indoor and outdoor use. They are the strongest and most rugged insulator of the kind made.

Sole Agent in the United States for the  
Pittsburgh High-Voltage Insulator  
Company.



**Westinghouse Electric & Manufacturing Company**  
East Pittsburgh, Pa.

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Bluefield, W. Va.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.

Charleston, W. Va.  
Charlotte, N. C.  
Chicago, Ill.  
Cincinnati, Ohio  
Cleveland, Ohio  
Columbus, Ohio  
Dallas, Tex.

Dayton, Ohio  
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Detroit, Mich.  
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Kansas City, Mo.  
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Los Angeles, Cal.  
Memphis, Tenn.  
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Minneapolis, Minn.  
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New York, N. Y.  
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Rochester, N. Y.  
St. Louis, Mo.

Salt Lake City, Utah  
San Francisco, Cal.  
Seattle, Wash.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
W. E. & M. Co.  
of Texas





# Phono-Electric

## Reports Read "Still Up"

Almost monotonous—that phrase "Still up" about so many installations in Philadelphia, one of the great Phono-Electric cities.

For instance, 2 miles of No. 0000 trolley wire have been up on Third Street between Brown and Reed ever since October, 1909.

It would mean much to your line department, to your rolling stock department and to your transportation department to network your city with a trolley wire that is good for double the life and many times the reliability of hard-drawn copper.

Continuity of service begins **at the top** with a wire that represents continuity of quality.

For Phono-Electric is Phono-Electric to the core. Besides possessing exceeding strength, ductility and toughness it possesses all these characteristics throughout its entire compass—not merely in its skin or surface.

**BRIDGEPORT BRASS CO**  
BRIDGEPORT CONNECTICUT

---

---





## Another Hazard Eliminated

When O-B Trolley Wire Pick-ups are a part of the regular equipment on your cars any motorman or conductor can safely pick up a broken trolley and fasten it securely out of the way. Traffic can continue and danger to persons on the street is eliminated.

A 14-inch hickory handle furnishes the insulation.

The trolley wire is gripped firmly by pulling on the rope. A permanent half-hitch around the handle holds the wire after the rope is released.



## O-B Trailer Connectors

For connecting trailer and motor car lighting circuits, etc.

When uncoupled all exposed parts are dead.

Complete description and listing of O-B Materials in Catalog No. 16.

## The Ohio Brass Company

Mansfield, Ohio



# The Short Space of Five Years Has Seen a Revolution in Passenger

Do you realize how fast has been the development of cars and car equipment?

Where is the non-payment car today?

Where is the long platform car so highly thought of five years ago?

Look at the tremendous changes that have taken place in fare collecting methods—all of them affecting car design and equipment.

## Annual Convention Number of September

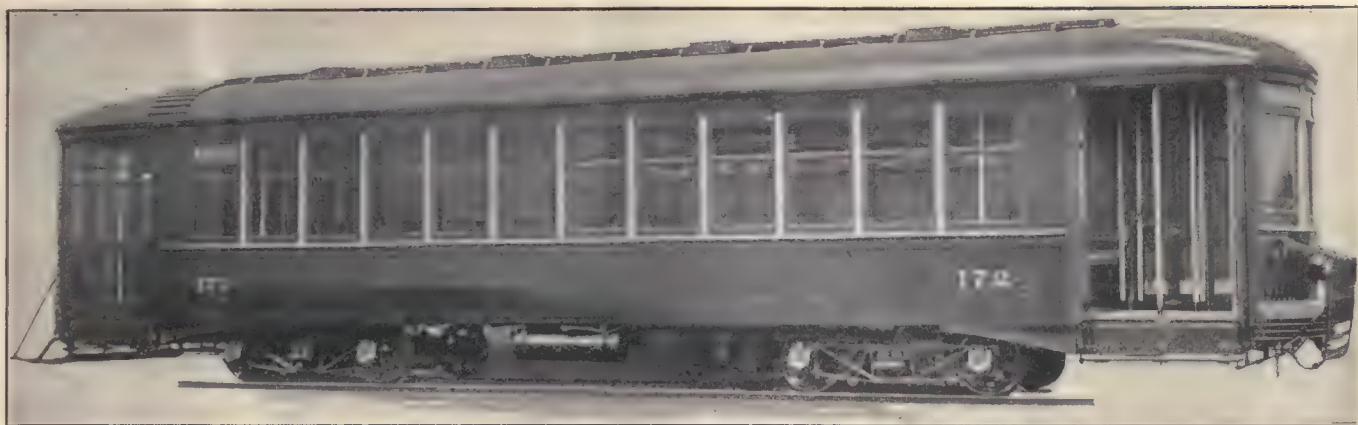
Can you imagine any subject that could possibly be more deeply interesting—more highly profitable for every electric railway man to read than this subject?

Is there any department of the electric railway business that is not affected by important changes in car design and construction.

Do you know of any other way in which a railway man can get this exhaustive, interesting, authoritatively treated material, in such compact, well digested and thoroughly indexed form, except by laborious personal research at sources of original information?—a labor he is hardly apt to undertake when it is already performed







# Car Design and Equipment

What has been the effect of side girder construction on car design?

What has been the effect of pneumatic door and step control on schedule speeds and accidents?

What has been the effect of arch-roof construction on ventilation?

All these things and many other relevant subjects will be pictured, analyzed and discussed in the

## the Electric Railway Journal 30th, 1916

for him and the result handed to him in the Convention Issue of the Journal. Do you think that the railway official can afford to ignore the **advertising pages** of an issue like this, that is replete with the most highly practical suggestions and data that the whole manufacturing side of the industry can devise and present?

Is there a manufacturer who can afford to ignore this opportunity to advance his business?

Our Copy Service Department is at the service of any advertiser to assist in the presentation of his arguments in the most efficient, interesting and attractive manner.

**Electric Railway Journal**

239 West 39th Street

New York



# "To Build a Good Line," Says Jim, You've Got to Use Enough Poles. You can do it if You Use Sturdy *Northern White Cedar Poles*

"Jim," said the electrical engineer, as the veteran foreman came in for instructions, "I notice that some of our neighboring public service concerns are having trouble with wire sag and tangles. You have escaped that. You've done a thorough job in the building of your lines."

"Good reason why they're having trouble," answered Jim. "They've got their spans too long. They've used some of those expensive, factory-made poles, and in order to keep the cost somewhere within gunshot of the right figure they used longer spans than they should to make a good line."

"We have escaped that trouble because you've always given me the right stuff to build them with. All good stout **Northern White Cedar Poles**. Their cost is so reasonable that we can afford to use enough poles to build right. Our poles carry the loads, stand the strain and pull. With **Northern White Cedar Poles** anyone can build a good line."

Jim Hit the Nail on the Head. The first cost of **Northern White Cedar Poles** is low, permitting the use of enough poles to build a sturdy and satisfactory line. The cost per pole per year is low because **Northern White Cedar Poles** give long service.

**Northern White Cedar Poles** offer great resistance to decay. They withstand great strain. They contain a large percentage of heart-wood which adds strength. Because of their light weight they are cheaply transported and erected. Their symmetrical form makes an attractive line. Sold under **Northern White Cedar Association Specifications**, which insure a high standard of quality.



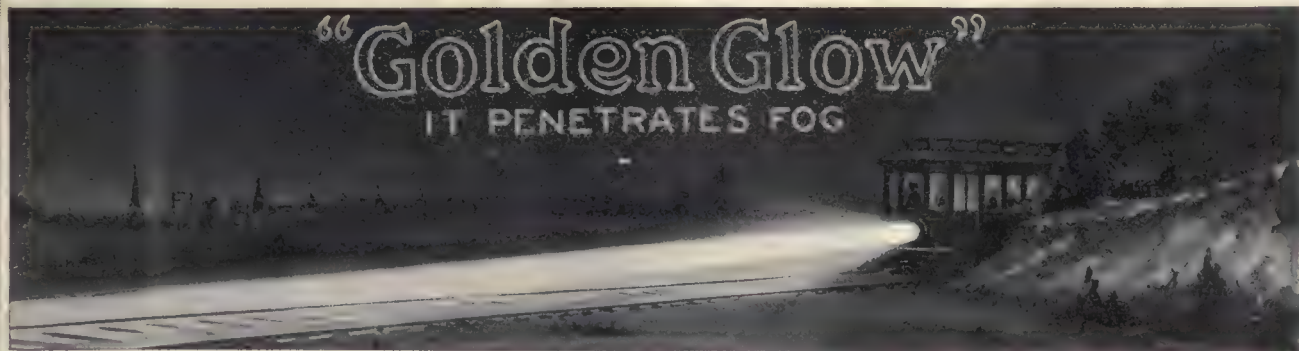
*Write For Further Information*

## Northern White Cedar Association

Lumber Exchange

Minneapolis, Minnesota





## *There Is No Other "Golden Glow" Reflector—Our Patented Process Fixes That*

No, sir, "Golden Glow" Reflectors cannot be duplicated, because they are made from a special glass, scientifically mixed and of a certain greenish-yellow color to produce that fog and dust penetrating beam of light—the "Golden Glow."

Furthermore, they are ground to a true parabola by special patented machinery, polished by special machinery and silvered by a process which is used only on the finest French plate mirrors.

"Golden Glow," the name behind these headlights, stands for a powerful beam of golden-yellow light which is non-blinding and wonderfully penetrating and which can be produced only by the famous "Golden Glow" Reflector.

Insist on the "Golden Glow"—the most practical and efficient headlight for both city, suburban and interurban service.

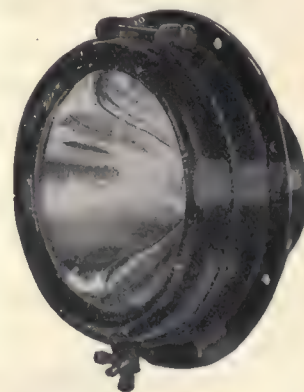
Here they are for city and suburban service. Which one is best adapted to your cars?



Type SE-95



Type SMG-95



Type SR-95

*Have us demonstrate them on your cars.*

### **ELECTRIC SERVICE SUPPLIES CO.**

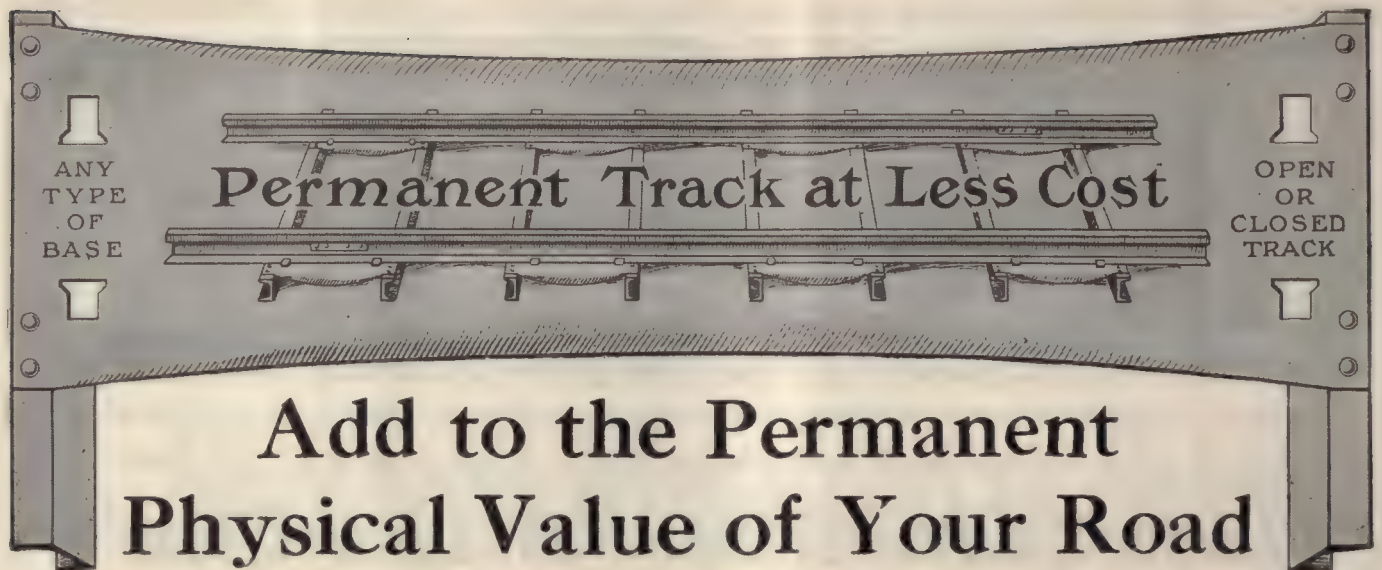
*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

NEW YORK  
50 Church Street

CHICAGO  
Monadnock Bldg.





ANY TYPE OF BASE

# Permanent Track at Less Cost

OPEN OR CLOSED TRACK

## Add to the Permanent Physical Value of Your Road



## International Steel Twin Ties

mean the elimination of perishable track material and the substitution of lasting elements in track maintenance.

They are to wooden ties what all-steel cars are to wooden cars.

They mean low first cost and low ultimate cost.

They reduce depreciation.

They prevent low joints and keep the track in good alignment.

If you are rebuilding old track that was laid with wooden ties in concrete, let us show you our plan for the rehabilitation of this track without disturbing the concrete and thereby getting service from the old concrete at a large saving in cost.

Our engineers will be pleased to cooperate with you in increasing the efficiency of your road.

We have a stock of steel on hand and can make prompt shipment of ties

## The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

### REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal.,  
Los Angeles, Cal., Seattle, Wash.

R. J. Cooper Co.,  
Salt Lake City, Utah.

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Maurice Joy,  
Philadelphia

William H. Ziegler,  
Minneapolis, Minn.



# National Interlocking Safety Door Control

## Will Save Power, Too!

IT'S OBVIOUS that NATIONAL Interlocking Safety Door Control—

Cuts running time by making door closing and car starting simultaneous;

Increases revenue by freeing the conductor from other duties such as handling signal ropes;

Reduces controller maintenance by curbing jerky manipulation.

IT'S NOT SO OBVIOUS that NATIONAL Interlocking Safety Door Control will save power too—but it does!

Therefore, we prefer to quote from William Arthur's **general** article on "The Fundamentals of Power Saving" published in The Electric Railway Journal for Sept. 2, 1916:

If in maintaining a certain schedule the motorman loses time—say, in responding to the bell or in notching up or in braking at too slow a rate—he wastes energy to the same degree, because the actual running time has been decreased. If the conductor loses time in giving the signal or in other ways, he causes energy to be wasted proportionately.

NATIONAL Interlocking Safety Door Control not only eliminates time losses between the conductor and the motorman, but also eliminates time losses between the motorman and the controller—

Because the car starts on the first notch automatically!

Want to know more? Write!



One of Fifteen Albany Cars Equipped with National Interlocking Safety Door Control

## NATIONAL PNEUMATIC COMPANY

50 Church St. New York



515 Laflin St. Chicago



# The Essential Thing in Track Grinding Is to Get an EXACT Result

An  
Unretouched  
Photograph



That Tells a  
Touching  
Story

It shows the corrugated surface of a rail after thirteen months' use. The touching part of the story is that the corrugations had been "ground out of it" twice during that time.

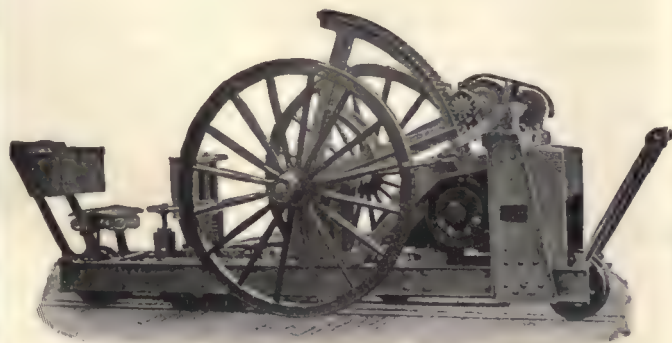
It is possible the corrugations were "ground in it" rather than "out of it." That's very likely to occur where a grinder does not give an *exact* result.

You can realize how exact the result must be to be a result and not a cause when you consider you are dealing with crests and depressions of the hundredth part of an inch.

## The Reciprocating Track Grinder

by the 400 strokes per minute of its 40 square inches of surface contact moving horizontally back and forth across the rail can and does produce exact results. It produces these exact results quickly, economically, and independently of the skill of the operator.

Other methods may produce exact results, but they cannot be depended on to give them always. When they do give exact results, the highly skilled labor, very fine adjustments and great waste of time involved make the cost disproportionate to the value of the work.



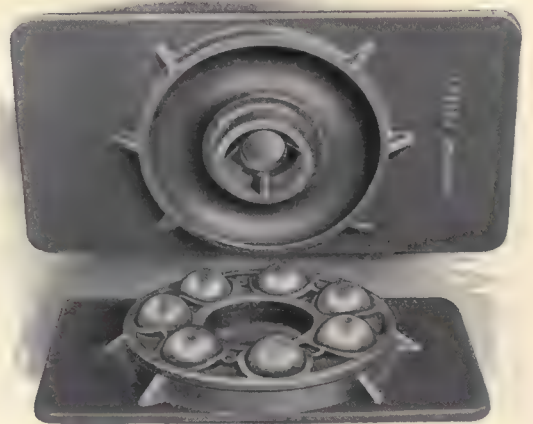
Exact results at the lowest cost is what we claim for the Reciprocating Grinder. We'll stake you to one till we prove it to your satisfaction.

**Railway Track-work Co.**

30th and Walnut Streets  
Philadelphia

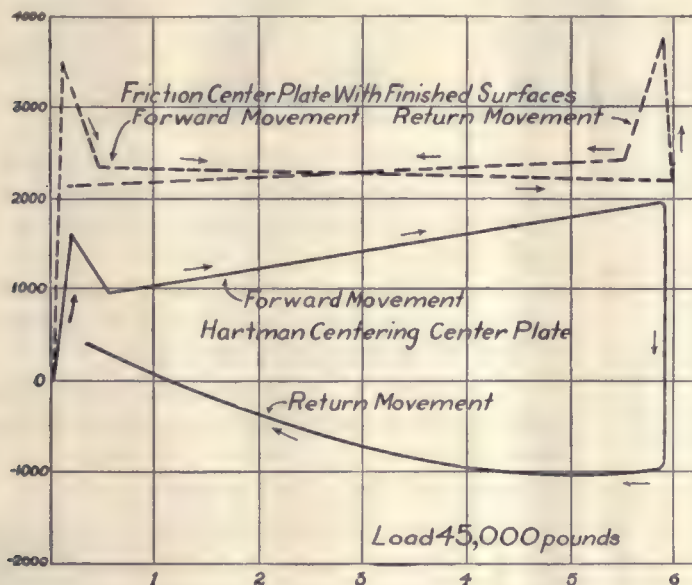


# This TEST shows Why HARTMAN CENTERING CENTER PLATES Save Flanges



The decrease in wheel flange pressure and wear in turning a Hartman-equipped truck compared with a truck having ordinary friction plates is illustrated in this chart.

This was made on the only machine in the world for determining side bearing and center plate efficiency, in the factory of The Joliet Railway Supply Company.



An ordinary center plate, with a load of 45,000 pounds, requires an initial flange pressure of over 3250 pounds to turn it, as compared to 1600 pounds with the Hartman centering plate. Moreover, the pressure necessary to straighten a friction plate truck increases to 3725 pounds.

With the Hartman plate the highest pressure exerted is less than 2000 pounds and never reaches the minimum with a friction plate. No pressure is required to straighten the truck with Hartman centering plates. This effect is obtained by the shape of the pockets in which these  $2\frac{1}{8}$ " diameter balls roll.

**Think of the saving in flanges  
and power**

*Study the diagram  
and send for catalogues  
and description*

## Holden & White

Electric Railway Distributors for The Joliet Railway Supply Company

**1508 Fisher Building, Chicago**

U. S. Metal & Mfg. Company, New York  
Alfred Connor, Denver  
Brown & Hall Supply Company, St. Louis

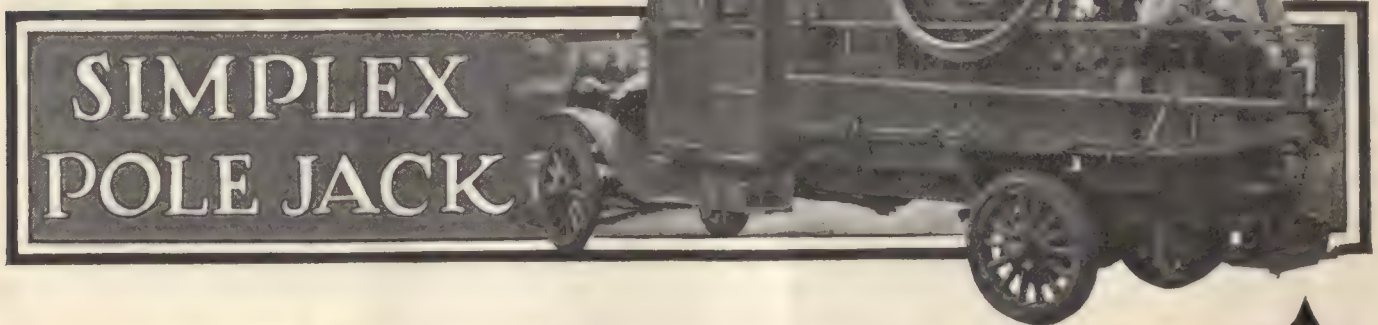
C. F. Saenger & Company, Cleveland  
C. E. A. Carr, Toronto  
F. F. Bodler, San Francisco

W. M. McClintock, St. Paul  
W. F. McKenney, Portland, Ore.  
S. I. Wailes, Los Angeles

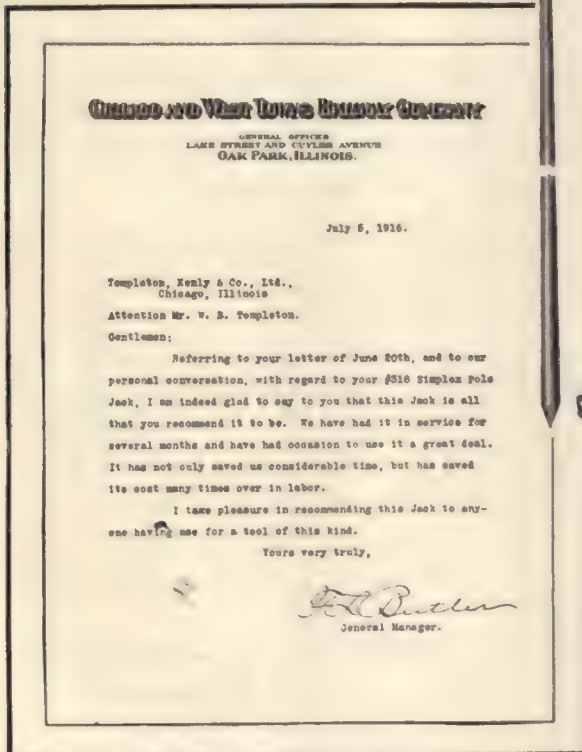


# The Emergency Truck

of the Chicago and West Towns  
Railway Company  
is equipped with a

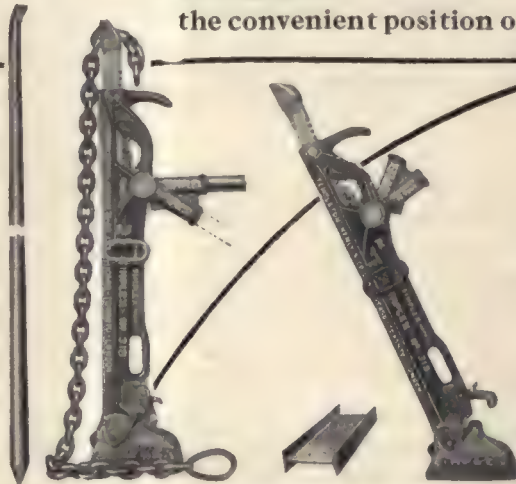


The following letter shows what  
General Manager F. L. Butler thinks  
of the Simplex Jack:



## Notice—

the convenient position on the truck



Here are the  
Reasons "why"  
YOU Should  
have the Sim-  
plex Pole Jack:

It saves time and labor, for one man can put a pole in any desired position. It is unnecessary to have a crew to straighten up a pole line.

It saves the cost of replacing pavements and curbing, for it is unnecessary to dig around the pole to straighten or pull it.

It saves personal injuries, for many linemen get strained backs from handling poles by the old method.

And as for economy, Mr. Butler says, "—has saved its cost many times over in labor."

This No. 318 Simplex can now be shipped immediately—complete with 8 feet of  $\frac{5}{8}$ -inch chain, "Verona" steel lever bar and I-beam base.

Send for a complete catalog of Simplex Pole Jacks—Emergency Jacks—Car and Track Jacks—Automobile and Motor Truck Jacks.

## Templeton, Kenly & Co., Ltd.

Established 1899

1022 So. Central Ave., Chicago  
2 & 3 Norfolk St., Strand, London, England



GOLD MEDAL  
for the SAFETY  
of JACKS Awarded  
by the International  
Society of Safety and  
Sanitation and the  
American Museum of  
Safety,  
1913.



~~Cast Iron Wheels~~  
~~Wrought Steel Wheels~~  
Davis One-Wear Man-  
ganese Tread Steel Wheels

## The process of elimination— Apply it to the Wheel Problem

The three types to be considered are: Cast Iron Wheels, Wrought Steel Wheels and Davis One-Wear Manganese-Tread Steel Wheels.

One-wear cast iron wheels with hard chilled treads and flanges do not provide maximum safety and economy under heavy equipment. Iron must be replaced with steel to sustain the shocks and pounding.

Wrought steel wheels are known as multiple wear wheels and must be turned in a wheel lathe several times during their life to obtain their full mileage, because no effective method has ever been devised for hardening the tread and flange of a wrought steel wheel, which is made of ordinary carbon steel the same as must necessarily be used in the plate and hub.

Turning the tread and flange of wheels presents many problems. In the first place, it means a large investment in shops, lathes, tools and other equipment. It means employing additional machinists to man the lathes, and extra men for changing wheels. When wheels are removed for turning, the car must be switched into the shop and delayed for varying lengths of time. The partially worn brasses must be replaced with new ones instead of giving their full wear, which involves both labor and expense.

The reduced diameter of the steel wheel after being turned necessitates readjustment of brake levers and raising the body of the car to preserve proper motor clearances.

The consideration of strength and safety in heavy service eliminates the cast iron wheel.

Turning wheels to obtain their full mileage is subject to so many objections that it would be a great relief to eliminate this type of wheel, providing the last alternative offers a remedy.

The Davis Steel Wheel is many times stronger than the cast-iron wheel, and is fully as strong as the wrought steel wheel.

It makes its full mileage on one-wear without turning, which frequent tests have demonstrated is equivalent to the ultimate mileage of the wrought steel multiple-wear wheel.

It combines the advantages of the one-wear principle of the cast-iron wheel and the strength, safety and mileage of the wrought steel wheel, without being subject to any of the objections to either. It very materially reduces the weight of the cars.

Apply the process of elimination in solving the wheel question and adopt the Davis One-Wear Manganese Tread Steel Wheel for your standard.

# American Steel Foundries

1100 McCORMICK BUILDING

CHICAGO





# Have You Neglected the Man in Perfecting the Car?



Old, inefficient motors have been scrapped; car weights have been reduced; Mazda lamps have been installed; many other changes have been and are being made in railway car equipment, resulting in lower power and maintenance cost.

Do not overlook the economy of modernizing your men by teaching them the advantages, possibilities and limitations of the equipment they control.

Your motormen control the power input, the accuracy of your schedules, the comfort of passengers and the life of your equipment. Any single item is sufficiently important to warrant your deep consideration. In the aggregate they are big enough to command **all** your attention until their percentage of efficiency is raised to a satisfactory figure.

There's a way to accomplish this with a minimum of effort and expense on your part. Let us tell you what Economy Meters and Economy Methods have done for other systems and will do for yours.

**ECONOMY**  
  
**METERS**

**Sangamo Electric Company**  
 Springfield, Illinois

Specialists in Meters for every Electrical Need





This All Steel Train of Differential Electric Dumping Cars belongs to the Cleveland Railway Co., Cleveland, Ohio. They save enough labor within one year to pay for themselves. They make more money than passenger cars.

## THE DIFFERENTIAL ELECTRIC DUMPING CAR

Is low and may be loaded while in tilted position. It is Electrically operated and discharges the contents far from the tracks. It is light and quick and pleases Everybody.

Trains of them are operated and unloaded in congested districts without interfering with passenger car schedules. We solicit your inquiries *now* so that we can arrange for prompt delivery next Spring.

Differential Car Company, Inc.

H. FORT FLOWERS  
PRES. & GEN. MGR.

141 Broadway, New York



# DEPENDABLE BRANDS OF TAPE

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## FRICTION TAPE

IDEAL  
UTILITY  
PERFECTION

HOLDTITE  
CLEVELAND  
GRAY PERFECTION  
PEERLESS WHITE

---

---

## SPLICING TAPE

HIGH GRADE  
MARCO

BUCKEYE  
2 X L

---

---

ARMATURE TAPE  
and  
CORKER TIRE TAPE

---

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**THE MECHANICAL RUBBER CO.**  
CLEVELAND



# Bonds that give efficient Service

must form a perfect union with the rail—  
and *maintain* that union.



## Electric Weld Rail Bonds

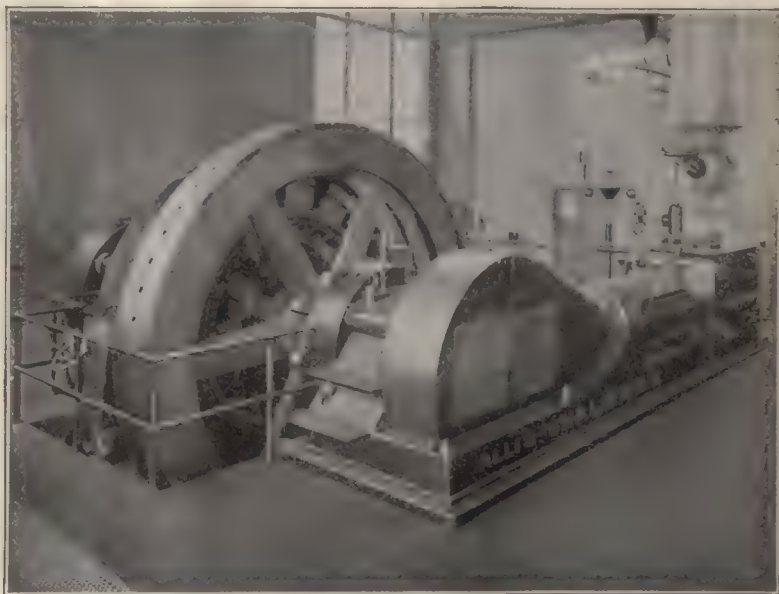
have the full area of the terminal welded to the rail. They do not corrode at the terminals. Therefore they do not increase in resistance.

Don't be satisfied with less than 8 to 1 actual welded contact.

**The Electric Railway Improvement Co.**  
Cleveland, Ohio

**WE HAVE BUILT  
6,000,000 HORSE POWER  
STEAM ENGINES  
GAS ENGINES  
OIL ENGINES**

We also build  
Steam Turbine  
Condensors  
Generators  
Motors, Etc.



Cross-Compound Direct-Connected Corliss Engine Unit.

*Our 40 years' experience is at your service*

**ALLIS-CHALMERS MANUFACTURING CO.**  
**MILWAUKEE, WIS., U. S. A.**



# Ask'em How They Like Their

# PETER SMITH

## Forced Ventilation

## HOT AIR CAR HEATERS

### Some Recent Repeat Orders:

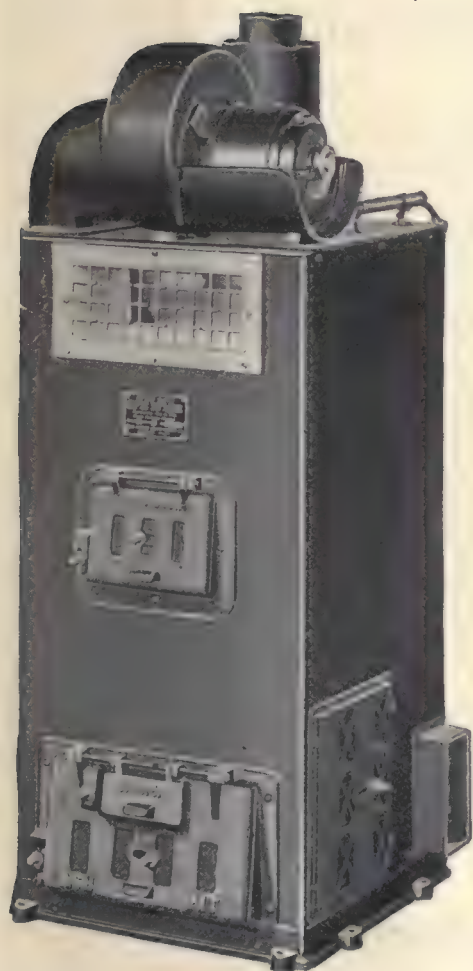
United Railways of St. Louis.....	209
Interborough Rapid Transit Co.....	70
Toledo Railways & Light Co.....	60
The Milwaukee Electric Railway & Light Co.....	50
Detroit United Railways.....	50
New York State Railways, Utica & Syracuse.....	47
Des Moines City Railway.....	40

Wherever you find a Peter Smith Forced-Ventilation Car Heater, you'll find the passengers comfortable and the company saving money.

A temperature of 50 deg. Fahr. is guaranteed for all heating seasons. 325 cu. ft. of warm fresh air are delivered every minute. Total cost, 28 cents per 18-hour day.

And we can show you corresponding efficiency and economy with **any** of the accepted types of heaters—hot-water coil types or forced ventilation electrics.

Better let Peter Smith experts figure on your requirements. We'll be glad to send blueprints and full data. Send today.



**The Peter Smith Heater Co.**

Detroit, Mich.

*Heater Specialists for Thirty-five Years*





# The Roll of Wisdom

## These roads have adopted as standard Grade M Gears and Pinions

Albany Southern R.R. Co.  
Berkshire St. Ry. Co.  
Buffalo, Lockport & Rochester Ry. Co.  
Cumberland County Pr. & Lt. Co.  
Des Moines City Railway  
Detroit United Ry. Co.  
East St. Louis & Suburban Ry. Co.  
Empire United Rys. Co.  
Hartford & Springfield St. Ry. Co.  
Hudson Valley Ry. Co.  
Illinois Traction System  
Indianapolis Tract. & Terminal Co.  
International Ry. Co.  
Lincoln Traction Co.  
Little Rock Ry. & Elec. Co.  
Milwaukee Elec. Ry. & Lt. Co.  
Pacific Electric Ry. Co.  
Rockford & Interurban Ry. Co.  
Santa Barbara & Suburban Ry. Co.  
San Diego Elec. Ry. Co.  
Schenectady Ry. Co.  
Springfield Street Ry. Co.  
Terre Haute, Indianapolis & Eastern  
Traction Co.  
United Traction Co.  
United Rys. Co. of St. Louis  
Westchester St. Ry. Co.  
Worcester Cons. St. Ry. Co.

Albany, N. Y.  
Pittsfield, Mass.  
Rochester, N. Y.  
Portland, Me.  
Des Moines, Ia.  
Detroit, Mich.  
St. Louis, Mo.  
Syracuse, N. Y.  
Warehouse Pt., Conn.  
Glens Falls, N. Y.  
Peoria, Ill.  
Indianapolis, Ind.  
Buffalo, N. Y.  
Lincoln, Neb.  
Little Rock, Ark.  
Milwaukee, Wis.  
Los Angeles, Cal.  
Rockford, Ill.  
Santa Barbara, Cal.  
San Diego, Cal.  
Schenectady, N. Y.  
Springfield, Mass.

Indianapolis, Ind.  
Albany, N. Y.  
St. Louis, Mo.  
White Plains, N. Y.  
Worcester, Mass.

6429

Is YOUR road on this list?

## General Electric Company

General Office:



Schenectady, N. Y.

Sales Offices in All Large Cities



# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, SEPTEMBER 9, 1916

No. 11

## EVILS OF UNION DOMINATION

We are publishing this week an interview with a prominent railway manager upon the evils of union domination. The interview was obtained before the crisis in the New York labor situation was reached, but the present New York strike affords an excellent example of the excesses to which labor goes after its unionization. Carried away by the seeming success which followed their efforts to establish a union on the surface lines about a month ago, the same labor leaders attempted to annex the elevated and subway lines of the Interborough Rapid Transit Company and to dictate what kind of a contract that company should and should not make with its employees. We are glad that the company has accepted the challenge thus presented. It realizes that it is paying its men liberal wages and under the individual form of contract is offering them continuous employment with better working hours for the next two years. The company also realizes that the great majority of its employees are satisfied with their rates of pay and working conditions and do not desire to be molested by labor agitators. Under these conditions the duty of the company to itself, to its loyal employees and to the public was plain. This duty was performed when it declared "Hands Off!"

## THE NEW YORK STRIKE

Less than five weeks ago a similar agitation on the surface lines belonging to the New York Railways was settled by the intervention of the Mayor and the chairman of the Public Service Commission for the First District. Under the agreement then reached all points of difference were to be submitted to arbitration, but this fact has not prevented the men of the New York Railways from declaring a strike a few hours after the one on the Interborough was called. If the union leaders had any grievances against the New York Railways Company about individual contracts or the discharge of employees, they should certainly have requested arbitration as required under the agreement. Is it any wonder that the managers of the Interborough company are unwilling to submit themselves and their properties to the perils of such domination? In view of the condemnation throughout the country of the unconditional surrender exacted by the Brotherhoods at Washington last Sunday, we believe that the people of New York will support the transportation companies in their attempt to control their own properties. It may mean some inconvenience for a few days, but this

inconvenience will be well worth its cost. Surrender now would mean surrender in the future to every demand, no matter how unreasonable, which might be made. New York City has a financial interest—or will have as soon as the new subways are completed—in the profits of the Interborough company. Its citizens, therefore, have a greater concern in the result than that of mere spectators. They are part owners in the enterprise and closely concerned with any changes in conducting the business likely to affect adversely the financial position of the company. We believe they will support it in its efforts to operate its property without outside dictation.

## ASSISTANCE FROM THE BUSINESS MEN

The business men of a community in past years have usually been keenly interested in the primary development of a local utility, but too often with the first signs of paying operation they have become indifferent to the further success of the enterprise. Such an ostrich-like attitude in regard to utility progress, however, is now becoming less frequent, and numerous examples are not wanting to show how business interests are actively co-operating with public service corporations in the solution of problems affecting the maintenance of successful operation. For instance, this week we are noting elsewhere a charter amendment which has been drafted by the Chamber of Commerce, Oakland, Cal., in an effort to help solve the financial and operating difficulties of the San Francisco-Oakland Terminal Railways. On still another page there is an announcement that the Chamber of Commerce of the United States is soon to hold a nation-wide referendum on the federal regulation of railroads. While it will undoubtedly be some time before business interests at large will seriously consider all the deeper questions of utility operation like regulation, business men in particular communities are coming more thoroughly to understand the simple points of their relationship with local utilities and to cultivate a broadness of vision that enables them more fairly to judge utility practices and utility needs. The commercial men of a community are the ones best able to understand the business problems and pitfalls that may confront public service corporations. They are also peculiarly the ones among the citizens to realize the important part which an electric railway plays in the business prosperity of every town. Hence, every effort should be made by electric railway companies to merit the support of this class of citizen and legitimately to secure it.



# TEACHING "SAFETY FIRST" THROUGH PLAY

As an intensive development of school safety work along sound educational lines, the Tacoma "school safety scout" plan described this week by T. N. Henry has much to commend it to the serious consideration of electric railway officials. Safety work in schools is not new, of course, but the Tacoma system is unusual in that it gives so much recognition to the educational significance of "play." Believing that safety lectures and illustrations are soon forgotten by a majority of school children unless there is some follow-up scheme to induce activity on the part of the children themselves, Mr. Henry has inaugurated a system similar to that of the boy scouts but emphasizing the point of safety. In so doing he has simply followed the fundamental pedagogical principles that play gives to children a pleasurable feeling which is educational and that, the best way to reach both the intellect and the emotions of children is through fostering their play instinct. The safety-scout plan may seem too complex in its play features to appeal to the younger school children, as it is a step beyond the individual play and later the social play to which they are accustomed. Nevertheless, it gives full opportunities for the two more advanced types of recreative activity, competitive play and team play, which through the years of adolescence inculcate the various principles of right conduct between individuals. In general, therefore, the safety-scout plan is one into which all the children will gradually grow, and it is worthy of emulation as a well-thought-out combination of educational theory and utility safety work.

## THE BAY STATE FARE DECISION

The decision of the Massachusetts Public Service Commission in the Bay State Street Railway fare case, abstracted elsewhere in this issue, is naturally disappointing in the light of the board's finding in the Middlesex & Boston proceeding some two years ago. In the latter instance, it appeared that a new lease of life had been granted to struggling companies endeavoring to pay a fair return upon their investments in the face of the shrinking purchasing power of the 5-cent fare unit. The findings of the board in the subsequent Blue Hill and New Bedford & Onset cases seemed the logical outcome of the Middlesex & Boston decision, and it was the common opinion in New England street railway circles that the demonstrated needs of the Bay State company would meet the same kind of encouragement. Consequently the refusal of the commission to permit the Bay State to try out its basic 6-cent fare schedule comes as a heavy blow to the company.

Looking below the superficial aspects of the finding, it is clear that the board is not wholly without sympathy for the company's position and that it has no desire permanently to withhold a return from the investor in this property, although the drastic prescription of turning back dividends into the system to improve its physical condition is written for the com-

pany's immediate observance. The problem of the company now is to obtain the additional revenue of \$588,816 to which the commission rules it is entitled. Perhaps the most interesting feature of the decision is its discussion of remedies for the company's present financial and physical situation. The commission has a large faith in the possibilities of increasing net revenue through various improvements in operation and by better co-operation on the part of the public than the company has hitherto enjoyed. Experience must show whether the commission's hopes can be realized. Doubtless some of them can be, if the board will back up the company in its endeavors to improve its service along lines demanding public support for realization. These include such matters as the sweeping reduction of pole stops, improved traffic regulation by local police departments, the abandonment of petty, provincial, obstructive policies in respect to the location of loops and other trackage, and active co-operation in all cases affecting the speed of cars. Other sources of increased net revenue in which the commission believes are the gradual elimination of open cars, the investment in new shops, the retirement of old rolling stock, the rehabilitation of present cars, the lengthening of headway on interurban lines and on over-served lines generally, the use of fare boxes, one-man cars and trailers, the development of electric freight service on the lines north of Boston, intensive traffic promotion on interurban lines, admission charges to parks, the installation of additional feeder capacity, the reduction of taxation burdens, especially in connection with paving, improvements in general organization and increase of fares on the rural lines.

The commission can assist the company materially in securing the larger co-operation of the public along the above lines. The financial value of such co-operation cannot easily be estimated, but it is certainly considerable. According to the evidence at the hearings, the company questions the feasibility of many of the foregoing remedies from the standpoint of producing adequate additional revenue, but if the public does its share, it may be that a substantial increase in net can be realized. The board will entertain an increase in the fare unit from 5 to 6 cents on the rural lines, but emphatically refuses to permit any increase in the cities, where the traffic would naturally yield larger gains. The fears of the commission that jitney competition would thrive in the face of a slight increase in the city fare hardly seem a basic ground for refusing the company the right to try out the program.

Whatever may be the reader's opinion of the decision and its reasoning, there is no question that it throws an exceedingly heavy burden upon the company, and that the future of this property depends in no small degree upon the willingness of the public to co-operate with the management in a large-minded way. And if the remedies proposed by the commission fail after a year's trial, the way is fortunately open for a further consideration of the company's problems and their possible or impossible solution by the 5-cent fare unit.



### POWER TRACK TOOLS SUPPLANTING LABOR

The scarcity and the increasingly higher prices which must be paid for ordinary track labor have compelled electric railway way departments to substitute power tools wherever they prove economical and will displace labor. In fact, the track labor situation has become so critical during the present construction season that it is only because of these power track tools that any considerable amount of rehabilitation and extension has been undertaken by many companies. In the handling and delivering of track material in the store yards the quantity must be exceedingly small when a company does not find it economical to employ a crane car or stationary derrick for loading and unloading. For this work the self-propelled crane or derrick car is the more popular because the ease with which it can be moved from one point to another greatly increases its usefulness.

In construction and rehabilitation work, the concrete mixing machine has almost entirely replaced the old method of hand mixing, as by it a gang of a half dozen men can mix and place more concrete in a work day than was formerly possible by a gang of four or five times that size. This tendency toward the substitution of machines for hand labor in track work is conspicuous also in trench excavation. A great many of the electric railway properties do this work either with a steam or electric shovels of their own or with one supplied by a contractor. In connection with the removal of the excavated material, as well as the delivery of sand, gravel, crushed stone, brick, cement and such material to the work, dump cars and other special utility equipment are being used almost exclusively. There was a time when most companies utilized for this service the ordinary 6-cu. yd. or 8-cu. yd. side-dump cars usually employed in heavy excavation and embankment work on steam and electric railroads built on a private right-of-way. This type of car, however, is being rapidly replaced by equipment especially designed for the loading and delivery of material on a public street.

While the center-dump car is being used to some extent, the side-dump type is more popular, and the one which will place the material on the pavement outside of the track trench has been found to be the most economical. Perhaps the latest substitution of a power tool for hand labor has been afforded by the pneumatic and magnetic ballast tampers. Experience has demonstrated that with one of these tools one man will do practically the work of six men with shovels or tamping bars. The electric railway offers a particularly attractive field for this equipment because power is available at any point on the line.

In summing up this evolution which is taking place in track tools, it may be said broadly that labor conditions have forced the change, and that the economy and independence resulting from these tools have made them an absolute necessity when the way department desires to accomplish its usual construction season's program. An excellent illustration of the principles outlined above is furnished in the leading article this week.

### CREDITABLE AND DISCREDITABLE ENERGY LOSSES

There has been of late a great deal of discussion in the technical press and before gatherings of railway men on the subject of reducing energy losses in car operation. The attention given to the subject shows that those responsible are determined to reduce energy consumption if this can be done without causing proportional increased expenses elsewhere. In considering the subject, it must be borne in mind that in one sense all energy put into a car is lost. Some of this loss is, however, commercially inevitable and, therefore, necessary. Such loss may well be called a creditable one, for it is creditable to permit a waste which could not be economically prevented. Those who have followed the development of the steam engine will recall that there was at one time a tendency to use a great many frills for the purpose of reducing steam consumption per horsepower-hour developed. Steam jacketing of cylinders, high degrees of superheat, excessive expansion of steam, etc., were sometimes used without regard to the fact that these might cause more expense than they would save. A well-known engineer once reversed the saying "The best is good enough" to "good enough is best," with the remark that some electric railways and other properties have been built with sole regard to technical perfection, thereby impairing their values as investments. The same reasoning will apply to car operation, in which it is always possible to reduce energy consumption below the economic limit. It is our belief that a great deal of energy is being discredibly wasted in electric car operation, but also that savings should be made strictly on an economic basis.

Without attempting a complete roster of these two kinds of losses, between which there is not a hard and fast line drawn, a few may be mentioned by way of illustration. A discreditable energy loss is one involved in carrying around useless dead weight in car body, trucks and equipment. Another is that which is due to the use of equipment not adapted to the work it is called upon to perform. Energy wasted at the brake-shoes due to running too long with power on comes in the same category. On the other hand, all brakeshoe loss is not discreditable, because cars must be brought to rest more quickly than their own friction will bring them. Some rheostatic losses are also necessary, because at starting the motor resistance and counter emf. are not enough to limit the current to the value necessary to produce the desired rate of acceleration. There must always, of course, be some friction in the best lubricated bearings and against the air through which the cars move.

Our purpose in directing attention to this division of losses is twofold. In the first place, it emphasizes the difficulty of comparing energy consumptions per car-mile or even per ton-mile under different operating conditions. It also indicates the importance of having on every railway property one or more men who are qualified and willing to make a special study of the economics of energy consumption in the cars on that property.



# Methods of Handling Track Work in Kansas City

The Construction and Maintenance Methods Employed by the Kansas City Railways Company to Keep Down Costs, and a Centralized System of Distributing Hand and Machine Tools Which Has Greatly Increased Efficiency Are Described.



KANSAS CITY TRACK CONSTRUCTION—VIEW OF TRACK READY FOR PAVING

**M**AINTENANCE methods which make certain prompt attention to all necessary track repairs, the elimination of lost motion in handling track materials, and a tool system which insures a full quota in first-class condition on all jobs, epitomizes the outstanding features of the methods employed by the roadway department of the Kansas City (Mo.) Railway. These results are obtained by an organization composed of the superintendent of way and structures, A. E. Harvey, to whom five roadmasters, a supervisor of tools, a supervisor of work trains and an office clerical and engineering force report. The territories assigned to the roadmasters are largely divided on a basis of convenience in handling. One roadmaster is assigned to the business district in Kansas City and four to the territory in the outlying districts.

## ORGANIZATION METHODS

Each roadmaster is responsible for all construction and repair work in his district and has reporting to

him a general foreman and an assistant foreman in charge of large construction jobs, and a number of foremen in charge of the small repair gangs. In addition to these a staff of switch cleaners and emergency men report to the roadmasters. The emergency men ordinarily engage in light repair work and are required to report to the office of superintendent of roadway every hour. The purpose of this is to keep the office in touch with their movements so that they may be sent promptly to take care of any emergency repairs. During the night these emergency men are subject to the call and orders of the train dispatcher.

One of the clerks in the office is detailed to receive all reports requiring emergency repairs. As a rule these reports originate in the operating department, hence notices of emergency track trouble are received from that department. All cases of trouble are noted in the trouble record book in red ink and an emergency man is promptly dispatched to remedy the difficulty. An entry in red ink indicates the time that the report of



KANSAS CITY TRACK CONSTRUCTION—VIEW OF BUSINESS STREET ABANDONED FOR TRACK WORK



trouble was received, and as soon as the difficulty has been remedied the emergency man reports it to the general office, where a record in blue ink shows the time the job is cleared.

#### ROADMASTERS MEET TWICE DAILY

In order that the superintendent of roadway may be advised of the progress of the work over the entire system, the roadmasters from the various districts meet at the general office at the noon hour and in the evening of each day. At this time they are advised of all the emergency trouble in their districts, and they in turn make all requests, on proper forms, for work that must be performed by other departments. For instance, all taps to the city fire hydrants for necessary construction or maintenance work are requested at this time, and requisitions are made on the proper city authorities. Jobs requiring bonding are also reported and requisitions made on the electrical department to have this work done.

In case sections of track under operation are to be taken out of service temporarily, the roadmaster files a request at the general office, in the morning prior to the night when track is to be abandoned. The superintendent's chief clerk then arranges with the train dispatcher for rerouting or detouring the cars which will be affected, and also notifies the roadmaster that all arrangements have been made. Following this verbal arrangement, the chief clerk writes a form letter to the operating department confirming the understanding. A copy of this letter is also given to the roadmaster and all others concerned in the change.

#### ORDERING AND DELIVERING MATERIALS

All requisitions for construction work originate in the office of the superintendent of roadway and are based on the estimates made for each job. These requisitions are sent to the storehouse, where they are held on open file and the material is drawn subject to the will of the roadmasters. At noon each day the roadmasters make known their material requirements for the following day on proper forms, and these are immediately written on an order form and sent to the storehouse. On re-

ceipt of these orders the storekeeper sets the material aside and it is loaded for delivery at night or the following day. In connection with the delivery of material, the supervisor of work trains has full charge of all the work trains and is authorized to deliver any material requested by a roadmaster when a requisition has been made to cover it. The supervisor of work trains arranges for their loading and dispatches them to various points on the system. Experience has demonstrated that this is a very efficient way of handling company material.

A great deal of duplication in mileage of work trains is avoided by organizing the transportation work in this way, instead of assigning one or two work trains to each roadmaster as may be required. The supervisor of work trains can consolidate the work in such a way that one train may answer the purposes of two or three different roadmasters on some particular trip. It also tends to develop efficiency, for if a train is assigned to a roadmaster regularly, there is a tendency for him to make work for it during slack periods in order to retain it. The method used has reduced the cost of work train service very materially, the average costs being as follows:

Asphalt, per square yard of paving.....	2.3 cents
Sand, per yard-mile.....	0.95 cent
Granite block, per yard-mile.....	0.16 cent
Cement, per barrel-mile.....	0.21 cent
Paving brick, per thousand per mile.....	2.04 cents

The cost of handling rail, including loading and unloading, is considerably more than for the other commodities and amounts to about 1.53 cents per ton-mile. All of these figures include the cost of the return trip.

#### HANDLING MATERIAL IN LIMITED STORE YARDS

As the track-material storeyards are limited in capacity, more than 75 per cent of the carload shipments to the track department are transferred directly from the steam railroad cars to those of the street railway. This saves one handling of the material, but necessitates much closer figuring upon the requirements and working closer to a program than some railways find to be practicable. By careful attention to the progress of the work, however, this plan operates very



KANSAS CITY TRACK CONSTRUCTION—TEMPORARY TRACKS ON ABANDONED STREET





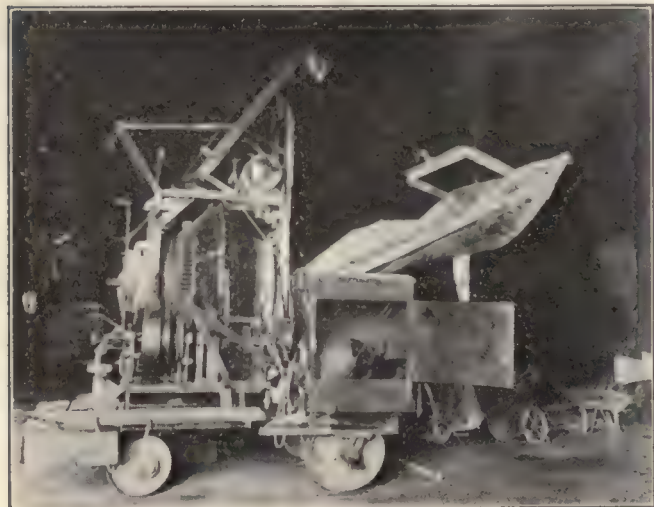
KANSAS CITY TRACK CONSTRUCTION—ONE OF THE OLD STYLE CONCRETE MIXERS

nicely. No serious delays have occurred due to failure to secure material, and it is very seldom that any demurrage accrues on the cars.

There are two principal storage yards, one for all special work used in making repairs and extensions, and the general storeyard where all classes of track materials are stored. In addition to these the company has an asphalt plant situated at another point on the system, and frequently bulk material such as sand and granite block is received at this point. To facilitate handling the latter, a stiff-leg derrick equipped with a clamshell bucket and a triple-drum electric hoist has been installed. While there is some storage space for sand beside this derrick, most of it is transferred direct from the steam railroad cars to those of the company. In connection with the asphalt mixing plant it is of interest to note that it includes ten pans having a daily capacity of 525 sq. yd. All usable asphalt removed from the street is delivered to this plant, where it is panned and delivered again to the street. The average cost of asphalt surface in place is 76.7 cents per square yard.

The track department rolling stock includes three 18-yd. Koppel dump cars, one 20-yd. side dump car, one crane car, two flat utility motor cars, one tool and supply car, one flat car for transferring equipment, two asphalt dump cars, six 6-yd. side-dump cars, three 6-yd. center-dump cars, five flat cars and one Knox tractor with a steel dump body, having a capacity for 9 cu. yd. of material and a stake body which is used in transferring track tools and equipment. The latter is an auxiliary piece of equipment used in emergencies.

It is also of interest to note that the Kansas City

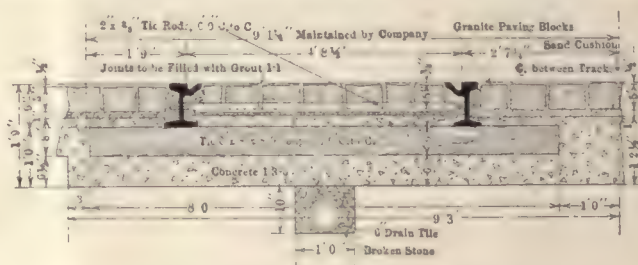


KANSAS CITY TRACK CONSTRUCTION—SELF-PROPELLED BATCH CONCRETE MIXER

Railways Company operates its own stone quarry which produces from 75 cu. yd. to 200 cu. yd. of crushed stone per day for use as ballast or as concrete aggregate. The stripping taken from this quarry is used as a filling material at points where it is needed on the system.

#### CITY HELPS TO HASTEN TRACK CONSTRUCTION

As a general proposition the railway company has been aided by the city authorities in hastening construction jobs. Temporary tracks laid on the street surface with portable cross-overs are permitted, and in some instances the entire street has been given over to the railway company in order to complete the reconstruction work in the least time possible. On two occasions, the busiest retail streets in the downtown district of Kansas City were vacated for this purpose, and the time required to do the work was reduced about one-half. In order to obtain this concession the representatives of the railway company called on the various business interests which would be inconvenienced by a partial vacation of the street during track reconstruction, and outlined to them the advantages of giving over the entire



KANSAS CITY TRACK CONSTRUCTION—CROSS-SECTION OF STANDARD 141-LB. GIRDER GROOVED RAIL TRACK

street. These interests appreciated the value of having the construction work out of the way in the shortest time possible and granted the necessary permission. The dispatch with which these jobs were handled and the careful consideration of the rights and wishes of the merchants during the progress of the work, have made other arrangements of this kind possible in both heavy and light traffic districts.

#### OFFICE RECORD SYSTEM

An atlas of the entire system of trackage, drawn to a scale of 200 ft. to the inch, on individual sheets 18 in. x 30 in. in size, provides a permanent office record of any and all repair or reconstruction jobs of any size. This atlas is kept up to date and the work for each month in the year is shown in separate colors. This, together with a detailed typed record, makes an excellent account of the department's work for any month in the year, or for the year as a whole. By a system of daily reports, these records for the month's work are all ready for use by about the fifth day of the following month. The quarry foreman, the granite cutter foreman, the welders, rail grinders, asphalt plant foreman and the asphalt layers all have printed record sheets which are very easily prepared and facilitate the work of compilation and calculating cost data.

All accidents, which occur on the work, are immediately reported by telephone to the chief clerk, where instructions are issued for the proper care of the injured employee. This gives an immediate record of the accident and in almost every instance the injured party can be attended by the company's physicians. To facilitate the handling of all departmental matters, all incoming and outgoing reports, mail, etc., pass over the desk of the chief clerk.

A directory of most of the regular employees of the

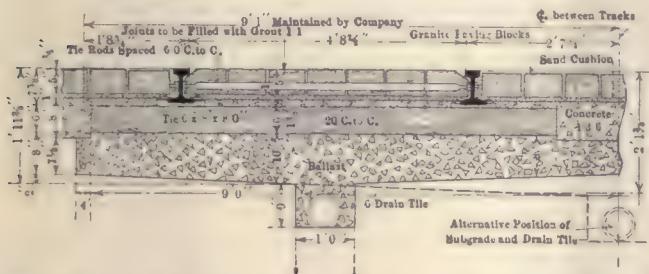


department is also kept, giving addresses and nearest telephones so that individual employees can be quickly located in case of accident. In this way any roadmaster, special foreman, or track foreman can be located within a few minutes. The division carhouse operating department offices assist in this by transmitting messages by motormen.

All requisitions on the storekeeper for material are made by the assistant engineers who also prepare the detailed estimates used when authority to do construction or rehabilitation work is requested. By a daily check received from the storekeeper, the superintendent's office is able to keep a fairly close record on what material is actually delivered on the various jobs. Roadmasters also report daily any material transferred to other jobs than the one for which it was ordered.

#### HANDLING TRACK TOOLS

As a rule the quantity and condition of track tools and equipment is everybody's business, but this is not so in the track department of the Kansas City Railways. On this company's system the entire tool problem is cen-



KANSAS CITY TRACK CONSTRUCTION—CROSS-SECTION OF STANDARD 7-IN. PLAIN GIRDER RAIL TRACK ON BALLAST

tralized under the supervisor of tools and equipment. Whenever a construction job is scheduled to start, the supervisor is notified and he makes it his business to see that the tools are not only supplied, but that they are in first-class condition.

Too often mechanical tools have been condemned because they have been put in the hands of men incompetent to understand their use or care for them. The manufacturers are, to a considerable extent, to blame for this as they encourage corporations to use such tools by telling what can be accomplished with them by unskilled labor. A power tool of any kind, by slight misuse, may be damaged and put out of service. If there is no one on the job who understands it, and generally neither the foreman nor the roadmaster is able to repair it, the tool is laid aside and the work progresses as best it may with hand tools. At a convenient time, possibly as early as the following day, the tool is sent to the repair shop, where, after considerable delay the repairs are made by a mechanic who may be entirely ignorant of the action of the tool in actual service. In due time the tool again appears on the street, to be put out of commission more quickly than it was repaired. Such has been the history of many tools ever since they were first put on the market.

Under the organization that exists on the Kansas City Railways, all special tools as well as the repairs of the simplest hand tools, are placed under the direction of a man who is familiar with their uses, and with their operation and repairs. Where the tools are requisitioned by a roadmaster, they are sent, together with operators who have full charge of them, and who report only to the roadmaster or foreman. It is the duty of these men to operate the tools, see that they are always in proper working order and that they are returned to the tool house in good condition. Frequently,



KANSAS CITY TRACK CONSTRUCTION—STEEL SIDE DUMP MOTOR CAR

under this arrangement, slight derangements are corrected immediately on the street, because the operator understands the machine and can locate the trouble. If the trouble is too complicated, a telephone call to the tool house will bring such further help as may be required. In this way the maximum service is obtained from all special tools, which include such equipment as concrete mixers, rail grinders, power drills, arc welders, thermit welders, stone crushers and asphalt kettles.

#### TOOL REPAIR FORCE

One of the railway company's old carhouses has been remodeled for a tool repair department and storeroom. In this repair department two blacksmiths and two helpers are employed regularly. Two repairmen and twenty-six others, including the operators of the power tools, make up the remainder of the force. The repair department is equipped with a small machine shop containing drills, grinders and a small lathe, and a wood shop with a circular saw, a sander, a band saw, and a mortising machine. A small plumbing and tin shop and a paint shop complete the tool repair facilities. In addition to the work on tools, all repairs to the wagons belonging to the company are made at this point. While this force is kept busy during the construction season repairing tools, the work does not cease during the winter months, but all tools are carefully put in first-class condition and painted a bright red as a distinguishing mark.

All tools are issued upon orders from the roadmaster and are charged out in a tool record. As fast as tools wear out or break they are turned in at the tool car



KANSAS CITY TRACK CONSTRUCTION—UTILITY MOTOR CAR AND TRAIN





KANSAS CITY TRACK CONSTRUCTION—ELECTRIC CRANE FOR HANDLING SPECIAL WORK

which returns bad-order tools to the storeroom and delivers new tools to the various jobs over the system. In the hand-tool department one or two men are continuously engaged in making repairs, and, as mentioned before, repairs to all power track tools are made by the operators assisted by the department blacksmiths and machinists.

#### ADVANTAGES OF TOOL SYSTEM

This method of handling tools through a centralized tool storeroom and a tool supply car, minimizes clerical work and insures the prompt delivery of tools to all jobs. Moreover, under this system there is no occasion for a man working with a defective tool which may either reduce his efficiency or injure him. As a matter of fact the elimination of all injuries due to defective tools has alone justified this system of handling them.

Included in the power equipment there are several small continuous mixers which have been found very satisfactory for small concrete jobs. A motor-driven batch mixer mounted on car wheels is the standard

The average cost of work train service has been found to be approximately 15.3 cents per mile for hauling heavy material, and the average mileage per day in this service is approximately 56 miles. The cost of handling light supplies on work trains is approximately 12.7 cents per mile, and these trains will average about 89 miles per day. These costs include crew wages and all other items properly chargeable to work train operation.

#### COST OF DELIVERING RAIL

The cost of hauling rail, including the loading and unloading charge, has been found to average as follows:

Labor loading.....	33 cents
Power loading.....	4 cents
Crew time.....	92 cents
Power unloading.....	4 cents
Labor unloading.....	33 cents
Total.....	\$1.66
Cost of delivery per ton.....	17 cents
Cost per mile hauled, inclusive of loading and unloading for the round trip.....	1.53 cents per ton
Derrick car capacity loading.....	10 tons
Three men loading 10 tons material in thirty minutes, rate per man, per hour..	22 cents

#### COST OF LOADING TRACK MATERIALS

The unit cost of loading various materials has also been calculated on the basis of a gang of twelve men receiving 17 cents per hour and one foreman receiving 20 cents per hour.

Item	Time	One Motor Load
Granite blocks.....	20 minutes	2,400 blocks
Cement .....	35 minutes	300 sacks or 75 bbl.
Pavers .....	30 minutes	7,500 blocks
Sand .....	30 minutes	21 yd.
Rock from cars.....	1 hour 30 minutes	21 yd.

Item	Unit	Cost
Granite blocks.....	1 sq. yd.	\$0.0078
Cement .....	1 bbl.	.0174
Pavers, brick.....	1 sq. yd.	.0090
Sand .....	1 cu. yd.	.0533
Rock from cars.....	1 cu. yd.	.1600

#### UNIT COSTS OF TRACK CONSTRUCTION

The following is the summary of the unit costs on ten different jobs of track reconstruction:

SUMMARY OF UNIT COSTS ON VARIOUS JOBS											
Location	Length	Rail	Ballast	Paving	Track			Paving			Grand
					Material	Labor	Total	Material	Labor	Total	
Hardesty, Seventh to Independent..	669 ft. D.T.	106 lb.	Crush Rock	Asphalt	\$1.61	\$2.59	\$4.20	\$3.21	\$. 93	\$4.14	\$8.34
Main Street, Ninth to Twelfth.....	1,182 ft. D.T.	106 lb.	Concrete	Granite	1.74	3.89	5.63	2.92	.46	3.38	9.01
Delaware, Fifth to Ninth.....	1,528 ft. S.T.	106 lb.	Concrete	Granite	.75	1.95	2.70	2.21	.76	2.97	5.67
Southwestern Boulevard, State to Rosedale .....	8,779 ft. D.T.	106 lb.	Concrete	Granite	1.52	1.55	3.07	2.98	1.15	4.13	7.20
Walnut, Thirteenth to Eighteenth..	2,315 ft. D.T.	106 lb.	Concrete	Granite	1.45	3.46	4.91	5.68	1.35	7.03	11.94
Wyandotte, Ninth to Twelfth.....	1,020 ft. D.T.	106 lb.	Concrete	Granite	2.45	4.49	6.94	5.02	1.41	6.43	13.37
Walnut, Seventh to Twelfth.....	1,880 ft. D.T.	141 lb.	Concrete	Wood Block	3.05	5.73	8.78	5.29	1.60	6.89	15.67
Holmes, Twenty-second to Thirty-first .....	5,569 ft. D.T.	91 lb.	Concrete	Granite	2.61	3.55	6.16	5.99	1.22	7.21	13.37
Twelfth Street, Liberty to Wyoming	480 ft. D.T.	91 lb.	Concrete	Granite	7.56	4.44	12.00	5.66	1.19	6.85	18.85
Washington, Eleventh to Thirteenth	654 ft. D.T.	91 lb.	Concrete	Granite	4.46	6.19	6.65	5.18	.61	5.79	12.43

equipment used on large construction jobs. Other track equipment includes tar and asphalt heaters, a stone crusher, thermit welding outfits, ratchet jacks of all kinds, a sand blasting outfit and a portable air compressor which is dismantled for shop use when it is not required on the street.

#### UNIT COSTS OF VARIOUS TRACK OPERATIONS

Unit costs of various roadway operations are always of interest, particularly when sufficient information is given to analyze the basis of calculations. For the guidance of the engineers making estimates on track repairs and construction jobs, the superintendent of roadway has compiled unit cost figures for practically every operation and all of the more common classes of track repairs. Practically all of the granite nose block is cut by the company, and the average cost for cutting 20,000 blocks, including the cost of sharpening the tools, is 2.9 cents per block. Old granite block is redressed at an average cost of 2.25 cents per block. This is the average for cutting 230,700 blocks for five months.



KANSAS CITY TRACK CONSTRUCTION—MATERIALS AND TOOLS READY FOR A REPAIR JOB



It is rather difficult to arrive at any average unit cost for track maintenance work because there are so many variables which affect the results. However, the unit costs for twenty typical cases of track repairs made in Kansas City are as follows:

Twenty-fourth Street and Southwest Boulevard	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$4.78	\$0.54
	Labor.....	1.21	.71
	Total...	\$5.99	\$1.25
			\$7.24

This 394 lineal feet of track work consisted of the renewal of a 9-in. rail tie-constructed double-track branch-off. The new work was 100-lb. rail, tie-constructed track with 282-sq. yd. granite paving, and the job was done by a gang of about twelve men.

Eighth Street—Troost to Woodland	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.36	\$0.64
	Labor.....	1.88	.54
	Total...	\$2.24	\$1.18
			\$3.42

This 1171 lineal feet of track was 106-lb. rail laid on beam construction with conduit and an asphalt paving. The reconstructed track contained 106-lb. rail on tie construction with 1750 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was done in stretches of from 50 ft. to 200 ft. by a gang of about forty men.

Independence—Woodland to Chestnut	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.33	\$0.28
	Labor.....	2.41	.24
	Total...	\$2.74	\$0.52
			\$3.26

This 7100 lineal feet of track was 109-lb. rail laid on beam construction, with conduit, cast welded joints and asphalt paving. The new track is 109-lb. rail laid on tie construction with a 6-in. drain tile under each track and 7100 sq. yd. of asphaltic macadam pavement on a 6-in. concrete base. The paving costs show only the costs of the concrete base, the wearing surface being laid by contract. The work was continuous, being done by a gang of about seventy-five men, and a temporary third track was used during construction.

Fifth Street—Grand to Lydia	Cost Per Lineal Foot of Single Track		
	Material .....	Track	Paving
		\$0.77	.46
	Labor .....		
	Total .....	\$1.23	
			\$1.23

Only 2363 sq. yd. of wearing surface was renewed, and about 50 per cent of the brick was new.



KANSAS CITY TRACK CONSTRUCTION—STOCK YARD RAIL-HANDLING EQUIPMENT



KANSAS CITY TRACK CONSTRUCTION—TRACTOR WITH STEEL DUMP BODY

Fifth Street—Washington to Oakland	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.57	\$0.50
	Labor.....	1.14	.58
	Total...	\$1.71	\$1.08
			\$2.79

This 282 lineal feet of track was and is 106-lb. rail laid on tie construction with 282 sq. yd. of brick paving. The work was done in stretches of about 20 ft. by gangs of about twelve men.

Twelfth Street and Walnut Street	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$10.36	\$0.88
	Labor....	2.55	1.36
	Total..	\$12.91	\$2.24
			\$15.15

This 198 lineal feet of track was 9-in. rail laid on beam construction in a double track crossing with a 100-lb. flange bearing crossing on tie construction tie drained, with 135 sq. yd. of granite paving. The work was done by day and night gangs of about twelve men each.

Fifteenth Street—Brighton to Colorado	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.36	\$0.86
	Labor.....	1.37	.40
	Total...	\$1.73	\$1.26
			\$2.99

This 1037 lineal feet of track was 84-lb. rail laid on tie construction and a wood block paving. The reconstructed track is 84-lb. rail laid on tie construction with 1388 sq. yd. asphalt paving and a 6-in. drain tile between tracks. The work was continuous and was done by a gang of about ten men.

Eighteenth Street—Main to Jackson Avenue	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.61	\$1.16
	Labor.....	1.64	.59
	Total...	\$2.25	\$1.75
			\$4.00

This 4218 lineal feet of track was 106-lb. rail, laid on 70 per cent beam 30-per cent tie construction, with both brick and asphalt paving. The reconstructed track is 106-lb. rail, laid on tie construction, with 6459 sq. yd. of paving, 30 per cent of which is brick and 70 per cent asphalt. A 6-in. drain tile is also provided. This work was done in lengths of from 15 ft. to 300 ft. by gangs of about twenty men.

Ninth Street—Bales to Cleveland	Cost Per Lineal Foot of Single Track		
	Material..	Track	Paving
		\$0.71	\$0.77
	Labor.....	1.65	.20
	Total...	\$2.36	\$0.97
			\$3.33

This 523 lineal feet of track was 106-lb. rail, laid on beam construction with conduit and asphalt paving. The reconstructed track is 106-lb. rail, laid on tie construction with 1362 sq. yd. of asphalt paving and a 6-in. drain



tile under each track. The work was done in stretches of from 50 ft. to 200 ft. by a gang of about ten men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Twelfth Street—McGee to Wyandotte	Material... \$0.52	\$0.57	
	Labor....		
	Total... \$1.09		\$1.09

The wearing surface only was renewed, and 1036 sq. yd. of old sandstone was replaced by granite block.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Woodland Avenue—Thirtieth to Forty-third	Material... \$0.40	\$0.85	
	Labor.... 1.20	.31	
	Total... \$1.60	\$1.16	\$2.76

This 3847 lineal feet of track was and is 106 lb. rail, laid on tie construction with 5347 sq. yd. of paving. The work was continuous and was done by a gang of about twenty men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Central Avenue—Sixth to Seventeenth	Material... \$0.52	\$0.85	
	Labor.... 1.32	.27	
	Total... \$1.84	\$1.12	\$2.96

This 1907 lineal feet of track was 106-lb. rail laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 106-lb. rail, laid on tie construction with 3906 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was done in stretches of about 100 ft. by gangs of about twelve men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Thirty-first Street—Main to Indiana	Material... \$0.87	\$1.21	
	Labor.... 2.19	.42	
	Total... \$3.06	\$1.63	\$4.69

This 2734 lineal feet of track was 106-lb. rail, laid on beam construction with asphalt paving, but without conduit. The reconstructed track is 106-lb. rail on tie construction, with 3759 sq. yd. of asphalt paving, and a 6-in. drain tile. The work was done in lengths of from 15 ft. to 150 ft., by gangs of about fifteen men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Independence—Walnut to Highland	Material... \$0.68	\$0.76	
	Labor.... 1.64	.40	
	Total... \$2.32	\$1.16	\$3.48

This 1389 lineal feet of track was 106-lb. rail, laid on beam construction, with asphalt paving, but without conduit. The reconstructed track is 106-lb. rail, laid on tie construction with 2162 sq. yd. of asphalt paving and a 6-in. drain tile between tracks. The work was done in stretches of about 50 ft. by gangs of about fifteen men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Main Street—Thirty-third to Westport	Material... \$0.40	\$0.95	
	Labor.... 1.21	.46	
	Total... \$1.61	\$1.41	\$3.02

This 8569 lineal feet of track was and is 80-lb. rail, laid on tie construction with 8818 sq. yd. of asphalt paving. The track was excavated to the bottom of the ties, the battered ends of the rails cut off, new joints applied, and the track resurfaced and paved. The work was continuous and was done by gangs of about thirty men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Walnut Street—Seventh to Eighth Street	Material... \$1.30	\$0.82	
	Labor.... 2.62	.32	
	Total... \$3.92	\$1.14	\$5.06

This 115 lineal feet of track was 141-lb. rail, laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 141-lb. rail, laid on tie construction with 123 sq. yd. of asphalt paving and a 6-in. drain tile under the track. The work was continuous and was done by a gang of twenty men.

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	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Grand Avenue—Seventh to Eighth Street	Material... \$0.88	\$0.35	
	Labor.... 1.84	.78	
	Total... \$2.72	\$1.13	\$3.85

This 498 lineal feet of track was 106-lb. rail, laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 106-lb. rail laid on tie construction with 498 sq. yd. of granite paving and a 6-in. drain tile under each track. Considerable old granite was used, on which there was no charge. The work was continuous and was done by a gang of twenty men.

	Cost Per Lineal Foot of Single Track		Track Total
	Track	Paving	
Troost Avenue—Eighteenth to Thirty-seventh	Material... \$0.65	\$0.99	
	Labor.... 2.02	.44	
	Total... \$2.67	\$1.43	\$4.10

This 6407 lineal feet of track was 106-lb. rail, laid on 50 per cent beam and 50 per cent tie construction, with an asphalt paving. The reconstructed portion is 106-lb. rail, laid on tie construction, with 10,822 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was continuous in stretches of from 50 ft. to 300 ft. and was done by twenty men.

## Referendum on Federal Regulation

The Philadelphia joint committee on the reasonable regulation of railroads has been notified by Elliot H. Goodwin, general secretary of the Chamber of Commerce of the United States, that the directorate of that body, at its next meeting, will act on the request of the joint committee, made through the Philadelphia Bourse, for an early referendum to determine the attitude of the commercial organizations of the country toward unqualified federal regulation of railroads. Recognizing the impracticability of a referendum on a specific program, the joint committee asks only for a vote on the general principles of the "Philadelphia plan," which was submitted by the Bourse last February and has been circulated throughout the nation by the joint committee. Previous reference to this plan was made in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1916, page 816.

In a statement issued on Aug. 30 the Philadelphia Bourse contended that any reform program should include, along with centralized regulation and an enlargement of the federal regulatory body, delegation to that body of power to regulate wages and the settlement of wage disputes. "To conceive properly constructive railroad regulation," the Bourse said, "the rate-regulating power should be accompanied by power to regulate questions of expenditures and the requirement that wage disputes be submitted to the same tribunal that controls rates, so that, when necessary, increases in wages may be covered by advances in rates. To expect proper regulation when, in addition to being hampered by conflicting state jurisdictions, the regulatory body has no control over expenditures, is inconsistent and illogical."

The government of Argentina has authorized the Buenos Ayres Western Railway to construct in its own shops, with the assistance of the Great Southern Railway, the coaches required for the company's electric service between the states of Once and Moreno. The Western Railway had originally contracted for these coaches in Germany, but the war naturally involved the cancellation of this contract. British firms were then approached, but had to decline the business owing to pressure of war orders.



# Training School for Safety Scouts\*

How to Supplement Safety Lectures in Schools with an Organization Tending to Induce Safety Work on Part of Children Themselves—Results in Tacoma, Wash., Surpass Expectations

By T. N. HENRY

Lecturer on Safety Tacoma Railway & Power Company, Tacoma, Wash., and Puget Sound Traction, Light & Power Company, Seattle, Wash.

THE subject of safety work in schools may be studied with profit in connection with the details of any particular system or plan which with a reasonably fair trial has shown fairly satisfactory results. For this reason I will here confine my attention to the origin, material, devices, working plans and some of the results of the "School Safety Scouts," under which name safety work has been conducted by me in the schools of Tacoma and Seattle during the last year.

The work in Seattle for the Puget Sound Traction, Light & Power Company has been limited thus far to lectures and the distribution of so-called safety-scout literature, while in Tacoma, under promotion by the Tacoma Railway & Power Company, the plan has been fully developed by perfecting, in each of the ward schools, the organization of a pupil safety committee, which is the chief instrument for carrying on the work. The plan having thus been carried further in the Tacoma schools than in those of Seattle, I shall limit this

paper largely to a discussion of the work in the Tacoma schools:

## WHY THE PLAN WAS INTRODUCED

We had been giving safety lectures in the Tacoma schools which were well received by both pupils and teachers, and which, through the schools, aroused sufficient public interest to create a demand for the lectures on the part of parent-teacher associations and other organizations. We became convinced, however, that the safety lecture, while very necessary as a part of any system of work in this field, should not be the sole reliance for lasting results in safety work with school children. Being necessarily limited to very brief references to a few phases of the question—little more than a mere introduction of the subject—the school safety lecture alone is not an instrument with which to achieve that percentage of efficiency which is in keeping with the standard striven for in modern business.

Thus, since the mere words, illustrations and figures of a single lecture before a school would be soon for-

\*Abstract of paper delivered before convention of Pacific Claim Agents' Association, in Tacoma, Wash., on Aug. 9-11.

## HOW CAN YOU TELL A GOOD "SAFETY SCOUT"?

### IN SCHOOL

1. He **KEEPS TO THE RIGHT** on walks, in halls, going up and down stairs.
2. He goes up and down stairs **ONE STEP AT A TIME**.
3. He **LOOKS** where he runs.
4. He doesn't bully the little fellows.
5. He sees that the little chaps have a fair chance on the playground and that they don't get hurt.

### OUT OF SCHOOL

6. He does not play on streets where street cars run.
7. He **LOOKS BOTH WAYS** in crossing streets and railroad tracks.
8. He **LOOKS SHARP** for automobiles, wagons and motor cycles when alighting from a street car.
9. He does not loiter around railroad stations or cars.
10. He does not walk on railroad bridges or tracks.
11. He makes the car stop before he gets off or on—the car can wait; but he steps lively.
12. He peeks 'round to see what's coming on the other side (or the other track) when crossing behind a street car. When carrying an umbrella, he peeks 'round that, too.
13. He doesn't hitch on or steal rides on street cars, automobiles or wagons.
14. He never uses his roller skates, his skatemobile or his coaster near street car tracks or where many automobiles run.

15. He does not jump off moving trains, cars or engines, and does not crawl over, under or between cars.
16. He says: "I have no right to take a chance of getting hurt; some one else may have to take the consequences."
17. He looks out for automobiles turning corners.
18. He looks where he goes and keeps to the right.
19. He looks and listens for **DANGER SIGNALS** and **HEEDS** them.
20. He says: "Any wire may be a 'live wire.' Don't touch it."
21. He keeps his eyes on a scratched match till he's sure the spark is dead.
22. He never leaves a camp fire till he's dead sure it's out.
23. He doesn't **THROW STONES**. He knows it's a **DANGEROUS** and **USELESS** habit.
24. He tries to do at least one Good Turn for Safety every day.
25. He **PLAYS SAFE**, as much for the other fellow's sake as for his own.
26. He thinks "Safety First"—not part of the time, but all the time.
27. His motto is: "Better Be Safe Than Sorry."
28. He has the **SAFETY HABIT**.

NOTE—Many of the best Safety Scouts are Girls.



gotten by a large majority of the children, and since nothing of a concrete nature other than a limited amount of admonitory printed matter was being left in the schools to keep the subject before the minds of the pupils, we believed that to prevent the larger portion of the work from being wholly wasted the initial lecture should be supplemented with something as a "follow-up" that should tend to induce activity on the part of the child himself. This concrete something should be so designed as to appeal to the child's imagination, to furnish scope for his enthusiasm and to supply material upon which to expend his overflowing energies. The child is the true idealist, and the humane side of the safety movement, when presented to him on his own level, makes a strong appeal to the best that is in him, and leads him to act accordingly.

Views to this end were submitted to the company, and authority was granted for the introduction of a plan to supplement the lecture work. The result was the school safety scout system. This plan of organization, formulated by the writer with many valuable suggestions and much helpful advice from H. G. Winsor, superintendent department of accident investigation Tacoma Railway & Power Company, was submitted to City Superintendent W. F. Geiger of the Tacoma schools for his approval early last October. After some changes suggested by him had been made for the purpose of better adjustment to local conditions, the plan was introduced in the schools the latter part of that month. Its distinctive feature—a feature we have so far regarded as unique in school safety work—is that it places the work almost wholly in the hands of the school children themselves and combines safety education and work with a simple and easily administered form of pupil government. The lectures after the introduction of the safety scout plan, while still serving the general purpose of a beginning in safety instruction, became the occasions for the introduction and explanation of the new pupil organization in a way that immediately caught the attention and aroused the interest of a large percentage of the pupils and gave an impetus to the more essential matter of getting them to act for themselves.

#### SAFETY SCOUT RULES ARE BASIS OF PLAN

The basis and chief feature of the school safety scout plan is a poster known as "Safety Scout Rules," shown in the accompanying illustration. This poster is headed with the question: "How Can You Tell a Good Safety Scout?" The answer, constituting the body of the poster, is a series of twenty-eight statements as to the conduct of the "good" safety scout in relation to practices, conditions and situations involving danger to human life and limb. The chief end toward which these so-called rules are designed to lead the child is the formation of the safety habit. "Get the safety habit" is one of the principal slogans of the school safety scouts.

In connection with the lectures in the schools we have had the cordial co-operation of the school principals and teachers, and by reason of this have had no difficulty in securing such grouping of the children as has generally given us an audience whose ability to comprehend has been not far from uniform. That is to say, each group addressed was usually made up of not more than three contiguous grades, more often of two only, and in some of the largest schools the ideal condition of one grade has been presented, thus giving the lecturer an opportunity to adapt the talks to the age and comprehension of almost every one of the group.

As a feature of every lecture, whether given before a class of kindergarteners or to a high school group, a

rehearsal in concert of various safety slogans suggested by the safety scout rules was given in true class yell style with the lecturer acting as yell leader. "Get the safety habit," "Better be safe than sorry," "Be careful all the time, everywhere—use your eyes and ears," "Look both ways," "Stop, look, listen," "Any wire may be a live wire—don't touch it," are some of the slogans or safety scout yells which have echoed through every ward school in Tacoma during the last school year and through a large number of those of Seattle.

Our safety scout organization for an individual school, as carried out in the schools of Tacoma, is composed of a safety committee consisting of two pupils, one boy and one girl, from each room, plus a safety scout master, to be appointed by the principal from one or the other of the highest two grades in the building. This provides a committee of from eleven to twenty-seven members, depending upon the number of rooms in the school. The work of this committee, consisting of recruiting, conducting examinations, checking on conduct of would-be safety scouts, inspection, patrolling, etc., is carried on by sub-committees, the results of whose work are made matters of record by the secretary of the general committee under the direction of the safety scout master and the advice of the school principal. The complete rules and regulations governing the formation and activities of the safety scouts and their committees are contained in a folder formulated by the author of this paper. This folder is signed by Mr. Winsor for the Tacoma Railway & Power Company and is approved by the superintendent of schools.

#### PRIZES AWARDED FOR INDIVIDUAL EXCELLENCE

In formulating the plan it was deemed essential that a number of awards for excellence in safety work be provided. These awards are of two general classes: (1) Those designed for individual pupils, and (2) those intended for classes, grades or rooms and for schools.

The awards for individuals are:

1. The safety scout button of white and green enamel with gold letters and bands, a white cross on a green ground encircled by a white enamel band bearing the words "Safety Scout" in gold letters, and

2. The official council or safety scout commission. This latter is issued by the Tacoma branch of the National Safety Council, signed by its president and secretary and, in approval, by the city superintendent of schools.

The safety scout button was designed by a Tacoma school boy in response to the offer of a cash prize by Mr. Winsor through the city superintendent of schools. The offer resulted in a large number of designs being submitted by both grammar grade and high school pupils. This, occurring as it did in the early stages of the work, served the important purpose of arousing interest and of giving to the movement a local coloring and significance highly gratifying to the children.

The official safety scout commission was also designed as a part of the local plan. As will be noted from the accompanying illustration, it is addressed to the recipient in the second person in order to obtain a more personal touch.

To win the safety scout button, and thus achieve full rank as a safety scout, it is necessary for the pupil (1) to memorize paragraphs 6 to 25 inclusive of the safety scout rules poster; (2) to recite these without error before the pupil sub-committee on examination, and (3) under the eyes of committee-member inspectors, to show excellence in living up to all safety scout rules for a period of at least two months. At all times it is sought to impress on the mind of the aspirant to this honor that the button worn by a safety scout is an



expression of his school's confidence in him and its certificate to the public that the wearer can be depended on to observe safety rules, not only for his own sake but for that of others.

The official safety scout commission is awarded to each of the two pupils in each room throughout the schools who are adjudged by their own organization to have made the best record in the observance of safety scout rules and in reporting to the safety scout master on dangerous practices and conditions. A special at-

of success in winning the required number of buttons was also made the occasion of a similar brief ceremony with the safety lecturer representing the company in presentation and the teacher speaking for the school in acceptance. Eighty-one rooms won safety pennants under this provision.

The school winning the flag did so with a record of 36 per cent of its pupils becoming winners of the safety scout button. The presentation and acceptance of this flag was made an occasion of interest in all the schools of the city by reason of the fact that the safety scout masters from other schools had places on the platform with their various school pennants and colors as invited guests of the winning school. A large number of patrons and friends of the school were present, and addresses were made on behalf of the schools, the parent-teacher association and the company, whose representative made the presentation address. This ceremony being held at a time (June 15) when the flag, patriotism and "Americanism" were ever-present topics of public speech and print, the event was made the occasion for emphasizing a number of the duties of good citizenship, among which all the speakers included that of aiding the safety movement by becoming good safety scouts and inducing others to do so.

#### THE CULMINATING EVENT OF THE YEAR—THE PICNIC

One thousand three hundred forty-seven pupils achieved full safety scout honors by meeting successfully the tests provided by the rules for winning the safety scout button. Three hundred and twelve of these, representing all of the twenty-one schools organized, were adjudged by the various safety committees to have qualified for the official safety scout commission. These, in company with a number of teachers from their respective schools, participated as guests of the company in what the pupils came to regard as the grand culminating even of the safety scout year, the first annual excursion and picnic of the Tacoma school safety scouts.

This excursion and picnic was given on Saturday, June 10, one week before the closing of the schools for the summer vacation, that date being chosen in preference to one after the beginning of vacation, for the reason that in the latter case many of the teachers would be out of the city.

For the purpose of the picnic free transportation was provided for the commission scouts and the accompanying teachers, this being delivered to the principals of the various schools previous to the date of the excursion. A common meeting point was designated at which the picnickers were to take the special cars provided for the occasion, and the happy 312 boys and girls, the flower of Tacoma's little army of soldiers of the common good, with a representation of the teaching corps from each school, indicated on that June morning that they regard punctuality as a safety rule.

The place of outing was the company's beautiful and spacious park at Spanaway Lake, the terminus of one of its suburban lines. A substantial luncheon with an abundance of ice cream and lemonade was served free by the company's extemporized commissary department, and an elaborate program of amusements and sports was provided. This latter was under the direction of the supervisor of physical training and hygiene of the city schools, assisted by a number of school principals and high school students.

An impressive feature of the day's program was the public presentation of each safety scout commission by a member of the city board of education. These were done up after the fashion of school diplomas and tied with green ribbon, and it is certain that no members of a school's graduating class ever received their diplo-

### COUNCIL SAFETY SCOUT COMMISSION

To....., Safety Scout, .....  
School, Tacoma, Washington:

*GREETING:—Whereas, you have been officially  
adjudged to have shown*

#### THE HIGHEST DEGREE OF EXCELLENCE

*in personally living up to "Safety Scout Rules" and  
in watchfulness for and reporting upon dangerous  
practices and conditions,*

*Now, Therefore,*

#### THE NATIONAL SAFETY COUNCIL

Local No. 23, Tacoma, Washington

*By its President and Secretary, as an expression of  
its confidence in you and of its approval of your con-  
duct, hereby commissions you as a*

#### COUNCIL SAFETY SCOUT

*to aid this Council in its work of promoting safety  
and to do all things consistent with its plan of at-  
taining such end, and it pledges you the advice and  
co-operation of its members in all matters relating  
to ways and means of preventing accidents.*

.....  
President.

.....  
Secretary.

Approved by

.....  
Superintendent Tacoma Schools

SCHOOL SAFETY SCOUTS—OFFICIAL SAFETY SCOUT COMMISSION  
ISSUED FOR BEST RECORDS

traction is given to this commission by reason of the fact that it confers upon the winner the privilege of being the guest of the Tacoma Railway & Power Company at the annual safety scout picnic.

#### AWARDS FOR GROUP ACHIEVEMENTS

The awards provided for groups and for schools are as follows: 1. A safety pennant for each room wherein at least three pupils win the safety scout button. 2. A standard silk or bunting United States flag for the school in which the largest percentage of pupils win the safety scout button. Basing this award on the percentage of pupils successfully passing the tests gives the smallest school an equal chance with the largest.

To each room of each school's primary department, covering the first three grades or years, a safety pennant was presented this year regardless of the number of pupils therein winning buttons. As a result of this the children in 112 primary rooms participated in an equal number of little ceremonials involving the presentation of the pennant on behalf of the company and its acceptance by the teacher. The presentation of the pennants to rooms or classes entitled to them by reason



mas with more apparent pride and gratification than did these safety scouts.

#### ORGANIZING THE SAFETY SCOUT LEAGUE

After the organizations in the several schools had been well established and large numbers of the children had become familiar with and interested in the plan and scope of the work, a safety scout masters' convention was held in the school administration building. At this "The Tacoma School Safety Scout League" was organized by the adoption of a constitution and by-laws providing for the usual list of officers and among other things for a membership of five (chiefly ex-officio) from each school and an ex-officio advisory council consisting of (1) the city superintendent of schools, (2) the commissioner of public safety of the city of Tacoma, (3) the president of the Tacoma Chamber of Commerce, (4) the secretary of the Tacoma branch of the National Safety Council, (5) the president of the Tacoma Labor Council, (6) the president of the Tacoma Automobile Club, (7) the supervisor of physical training and hygiene of the Tacoma schools, and (8) the safety lecturer of the Tacoma Railway & Power Company.

A part of the paragraph setting forth the objects of this central organization reads as follows: "(2) To exchange ideas and information relative to methods of carrying on the work of our school safety committees;

"(4) To unite all the girls and boys of the Tacoma schools for the purpose of interesting all citizens in safety scout rules;

"(5) To seek the advice and counsel of other organizations and persons interested in safety work."

Thus the safety organizations in the various schools of the city provided themselves with a clearing house for ideas pertaining to their particular line of work corresponding in its relationship and functions to the National Safety Council in its relation to the safety organizations of the mills, factories and transportation companies of the country at large.

#### RESULTS HAVE SURPASSED EXPECTATIONS

It is gratifying to be able to state as a general observation that this company's campaign during the last year in school safety work under the plan herein described has surpassed all expectations in what it deems good results. It has not only enlisted the active and enthusiastic interest of a larger percentage of the school children than was expected, but it has induced a keen interest in safety measures on the part of the many parents who heretofore have given the subject practically no thought, and it has attracted the favorable attention of the public generally.

A very potent element in the work of interesting the public in the movement has, of course, been the support of the newspapers in the way of news reports of these activities in the schools. The 15,000 school children of Tacoma, however, carrying their safety slogans into every home in the city, and in thousands of cases constituting themselves the advisers and protectors of other members of the family, afforded a means of effective publicity not second even to the newspapers. Moreover, an indispensable element of success in the safety work was the co-operation of the school officials and teachers. This we had in both Tacoma and Seattle. In Tacoma Superintendent Geiger was found to be deeply and actively interested in all manner of safety measures and in the movement generally. He gave a ready hearing to our initial proposal, invited the presentation and discussion of the plan before meetings of his ward school principals, and subsequently through official bulletins lent approval and encouragement to the work by urging principals and teachers to co-operate

with us. The principals and teachers, with a cordiality showing their right appreciation of the great humane problem involved, gave in full measure the needed support.

#### PRINCIPALS TESTIFY TO VALUE OF PLAN

At the close of the year's work I addressed a letter to the principal of each of the twenty-one schools organized, asking for an estimate of the work and its influence upon the pupils. The replies need no comment to make it clear that the safety scout movement has become a potent factor in the work of solving the safety problem of Tacoma.

The principal of one of the largest schools, a man of long and successful educational experience, says:

"The influence upon the habits of pupils has been noticeable in many ways. Pupils do not take chances as they did before. One boy discovered a live wire on one of the city light poles and promptly reported it. Other boys have reported broken sidewalks in various parts of the district. Both boys and girls report promptly reckless driving by automobiles, frequently giving the number of the machine. The influence on the school as a whole has been marked. Formerly larger boys often promoted 'fights' among the little fellows. Now every scout feels that he is a special officer to prevent such. The parents whose children attend the school are pleased with the movement, and in many cases give active co-operation. Your plan of organization is a good one, and can be adapted to fit the conditions peculiar to any school."

The head of another large school says:

"In a general way it has set the reckless child to thinking more of his acts in their relationship to the school as a whole and to the rights of others."

Another states:

"Our safety scout organization has been a live, helpful agency in this school. To a large extent this body has helped in inspiring a wholesome respect for safety first ideals."

A principal whose school shows a record of two rooms in which every pupil qualified for a safety scout button and a total of 142 button winners for the school, states:

"Pupils have been more careful, not only at school but on the streets and elsewhere. They have been on the lookout for dangerous places, hanging wires, defective sidewalks, etc."

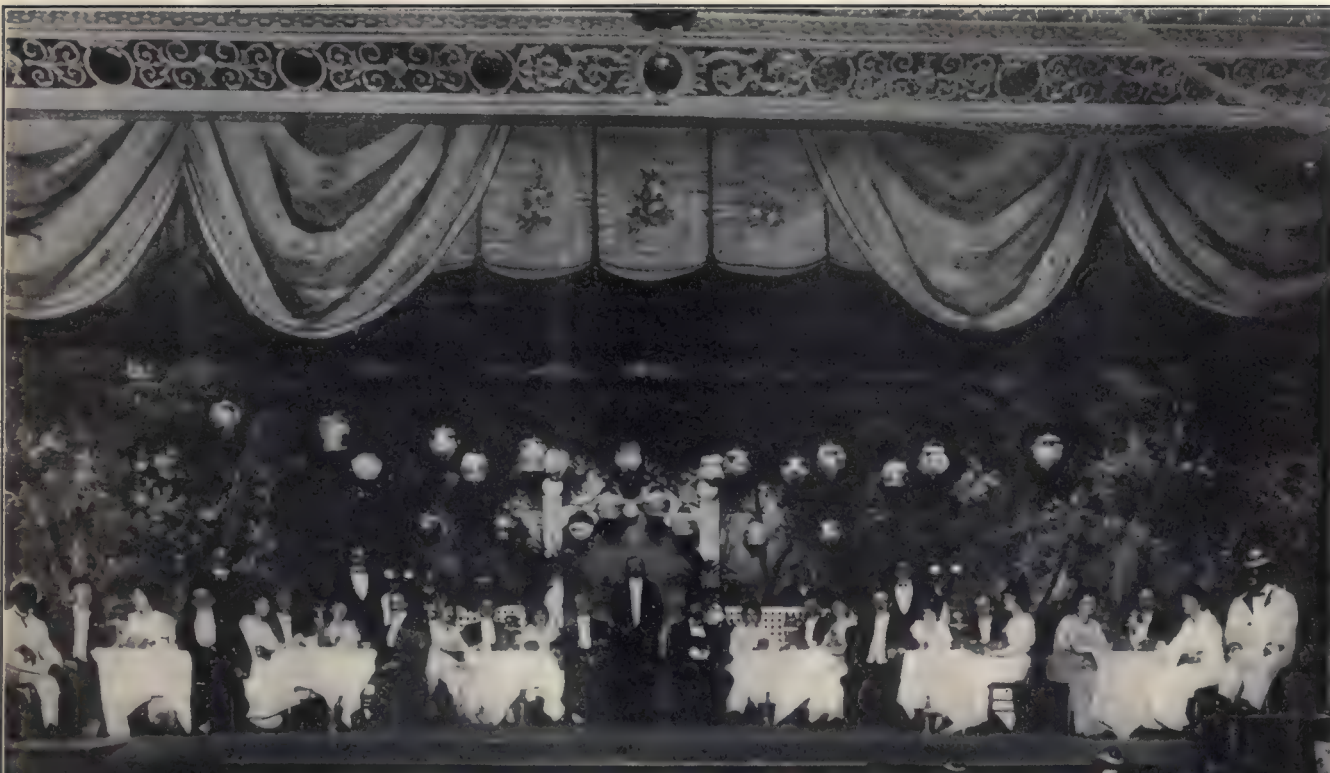
A lady principal, referring to conditions in her school after the work had been well started, remarks:

"A spirit of caution seemed to spread through the school. Teachers and principal began to realize that the responsibility of seeing that dangerous practices were avoided was being shared by a large number of the pupils."

The fact that this plan of organization, or any similar plan, offers itself to the teacher as an instrument for working out incidentally problems of discipline and arouses in the child an interest that is in harmony with the teacher's aims in this connection, will win for it the active support of the earnest teacher who becomes familiar with its workings.

There are now 1347 boys and girls in the city of Tacoma, ranging in age from ten to seventeen years, each proudly wearing the badge of a safety scout. Here are 1347 missionaries for the cause of safety; 1347 potential citizens with childhood's idealism unspoiled enlisted with abundant enthusiasm to spread the gospel of caution and carefulness. We are confident that the work has been well worth the doing and that the seed sown in so propitious a soil will produce a harvest in ample compensation for the effort and expense put forth in the work of opening the field and the labor of sowing.





Cast in "Care Cure," a Musical Comedy, Presented by Milwaukee  
Electric Railway & Light Company Employees

## Co-operative Activities of Railway Employees

Bert Hall, Welfare Secretary of The Milwaukee Electric Railway & Light Company, Describes  
Welfare Work of Public Utilities in General and That of the  
Milwaukee Company in Particular

**I**T is an indisputable fact that any co-operative activity which promotes the health, happiness and well-being of a large number of persons living in a community will react upon that community in a beneficial way. That electric railways are alive to the value of mutual benefit and welfare associations is shown by the number of such associations that have been formed within the last few years. Among the most successful of these has been the Employees' Mutual Benefit Association, organized four years ago among the employees of the Milwaukee Electric Railway & Light Company and associated companies.

In a paper delivered before the local company section of the American Electric Railway Association on May 25, 1916, Bert Hall, welfare secretary of the company and chairman of the section committee on co-operative activities, explained the plan and scope of the above-mentioned work. He also gave the results of certain investigations conducted by his committee into the operation of welfare work elsewhere. In preparing his paper Mr. Hall had assumed that what the employees desired was a discussion of those co-operative activities embraced in the general term "welfare," and which are designed not only to promote the welfare of employees, but also that of all others concerned in a great business enterprise.

### THE LOCAL ASSOCIATION

The Employees' Mutual Benefit Association of The Milwaukee Electric Railway & Light Company was organized in 1912 primarily for the purpose of creating, managing and distributing a fund to provide free medical assistance for members incapacitated for work by

sickness or accident when not within and subject to the provisions of the workmen's compensation act. The association has become a most efficient machine for conserving the health of those who work for the company and for caring for their dependents whenever disease or accident necessitates medical or surgical care. Its greatest field of usefulness has not been the payment of sick benefit or death claims, but rather the conservation of the health of its members. Through the opening of doctors' offices at the places of employment, it has been possible to reduce the amount of time lost on account of sickness by fully one-third, making a total annual saving of more than 10,000 work days annually.

### WHAT OTHER COMPANIES ARE DOING

During an investigation made by the committee of which Mr. Hall was chairman it was found that seventy-nine of the leading street railway and electric light companies of the United States conduct welfare work, which provides either life insurance or sickness and accident insurance, or both, through various agencies. Seventy-one companies do this through employees' mutual benefit associations which will be described later, five have additional benefits similar to those provided by the association of The Milwaukee Electric Railway & Light Company, in the form of insurance. Certain other companies provide life insurance policies for employees, the company paying the entire premium for a blanket policy covering all of its employees, in which case insurance ceases with employment by the company.

These mutual benefit associations group themselves naturally into four distinct classes, as follows:

Associations in which the members pay a certain





SCHOOL FOR LINEMEN, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

amount of dues and to which the company contributes to some extent.

Associations in which the membership is divided into classes according to salaries received. In a typical case of this kind the dues range from 30 cents to 90 cents per month, the benefits from \$7 to \$12.50 per week, and the death benefit from \$300 to \$600.

Associations to the funds of which the individual members contribute nothing, the entire expense of sick benefits and death benefits being borne by the employing company.

Associations maintained entirely by employees, and to which the employing company contributes nothing in the way of money, but may contribute to rental of quarters and some clerical help.

By far the largest number of the associations maintained by electric railways or electric railway employees belong to the first class. Only one of the large companies of the country operates under the second type of association, and two large corporations operate under the third form. The fourth form, that in which the association is maintained and operated by the employees, seems to be the least popular, as the employees appear not to have sufficient confidence in this type of organization to warrant them in joining it. In one large company having an association of this type only 30 per

cent of the employees are members of the mutual benefit association.

As welfare of this kind has been conducted by some of the companies for the past fifteen years, and as from reports it is plain that no standardization of practices has been reached, it would seem that a committee on employees' welfare of the national association might well take up this matter, sifting out from the various types of associations those which seem to have produced the best results, and recommending more uniform adherence to the best practice.

#### WOMEN'S RELIEF WORK

Apparently not more than four or five companies employ visiting nurses to assist in caring for those who are sick, nor are there many associations which have well-organized visiting committees, whose duty it is to give assistance to those who are sick or injured, in addition to the relief afforded by the medical department.

In the work of caring for those who are sick, the women's auxiliary of the Milwaukee association has proved extremely helpful. It was organized during the past year, and has been of great assistance in those cases where the regular benefit provided by the association does not completely meet the requirements of the case. It provides for the household duties and the taking care of small children in cases where the mother of a family has been sick for a long time, where the finances of the family will not permit of the hiring of help, and where there is no relative who can step in to perform these duties. Through this agency a number of poor families have been provided with Christmas cheer, and it has also been very helpful in providing social recreation.

#### EDUCATIONAL AND RECREATIONAL WORK OF THE LOCAL ASSOCIATION

Among the educational features of the association's work a branch of the public library has been established in the Public Service Building; company sections of the American Electric Railway Association and the National Electric Light Association have been organized, and regular departmental schools have been founded. The annual report shows that the total attendance at the departmental educational classes during the year 1915 was 15,529 persons. During the past year the educational and social auxiliary of the association has played an important part in giving to employees an opportunity to hear lectures on timely topics of high educational



DRILL TEAM EMPLOYEES' MUTUAL BENEFIT ASSOCIATION, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY



value. These included travel talks on Mexico and on the great cities of Germany, the experiences of an ambulance driver during the European war, and lectures on South America and the American Indians.

That wholesome recreation is considered important by the officers of the Milwaukee association is evident from the wide field covered by its recreational activities. During the winter months these take the form of dances and musical and dramatic entertainments, pool playing, indoor baseball and bowling. These activities are in charge of committees of the benefit association, which

deserving and are in real need of assistance. Otherwise it would be easy to convert such a fund into a menace rather than into a help to the employees.

#### PENSIONS

The section committee found only six railway companies which provide pensions for employees who have become incapacitated for work through age, sickness or accident. The rules governing the granting of pensions by these companies fix the age of retirement at about sixty-five years, and the duration of service at from twenty to twenty-five years. The minimum retir-



THRIFT DIAGRAM USED IN MILWAUKEE WELFARE WORK

Shows results of laying aside \$5 per month: upper figures in building and loan association, lower ones in savings bank at 3 per cent interest, after one year and half and full maturity of shares respectively

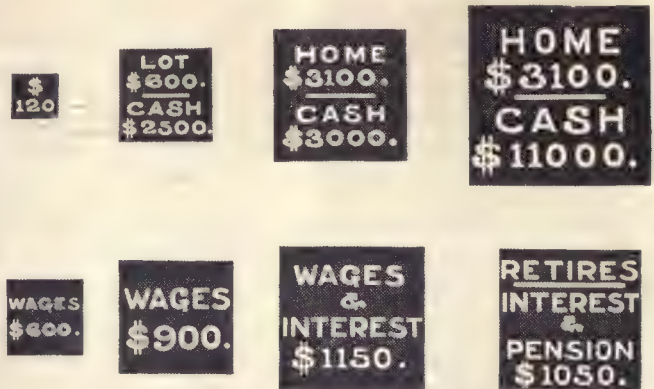
have done their work exceedingly well, and all of the various events have been well attended.

#### PROVIDENT FUNDS

Very few companies were found to be doing any systematic work to promote thrift among employees. The employees' mutual savings, building and other associations of the Milwaukee company stand out as conspicuous examples of this kind of co-operative work. The opportunity which they give to a thrifty family to lay aside something for a rainy day, and the readiness with which the employees of the company have taken stock stamp this as one of the most beneficial of the several forms of the company's work. Four or five other electric railway companies have arranged to loan money to employees temporarily in need due to sickness or death in their families. The general custom is to charge interest on the money loaned.

The Milwaukee Electric Railway & Light Company has made provision for such emergencies, but makes no interest charge. Since the benefit association has extended its scope to provide medical attention for the wives and dependent children of its members the necessity for making such loans has been greatly reduced. Since Jan. 1, 1916, the association medical staff has made 2852 calls on dependents, and has performed fifty surgical operations which would otherwise have cost employees \$4,561.

The value of such work as this as a provision for circumventing the notorious loan shark is very evident. Such a fund, however, needs to be administered with great care because there are sure to be some in a large body of workers who will attempt to take improper advantage of it and to ask for loans for very frivolous reasons. The Milwaukee Electric Railway & Light Company carefully scrutinizes all applications for loans, making a thorough investigation as to the necessity in each case, to insure the fund against unnecessary drains and preserve it intact for the benefit of those who are



THRIFT DIAGRAM USED IN MILWAUKEE WELFARE WORK

Shows possible financial history of employee between 21 and 60 years of age; initial capital \$120

ing age appears to be sixty years, and the duration of service fifteen years, these being the limits set by The Milwaukee Electric Railway & Light Company. In this regard the company is in advance not only of other street railway and electric lighting companies, but also of the several departments of the city government of Milwaukee. The city pension system involves liberal contributions from the wages of policemen, firemen and school teachers, and much longer periods of service.

#### WORK OF THE SECRETARY OF THE ASSOCIATION

Considerable general welfare work is performed through the office of the secretary of the benefit association of the Milwaukee company. During the first three months of 1916 there were 863 calls made at the secretary's office by persons who needed help in solving their problems, and he made ninety-eight calls outside of the office for the purpose of giving such help. The calls made outside of the office in cases of sickness and death, and in making investigations relative to troubles of employees, numbered 1018, which added to the other outside calls mentioned made a total of 1881, an average of about twenty-one calls per day. The demands on the secretary's time have increased to such an extent that it has become important for all departments to co-operate closely with him to eliminate useless calls, for example, by prompt reporting of recovery from sickness or accident and of the removal of patients to the hospital.

In conclusion, Mr. Hall summarizes the ideals of welfare work about as follows: The very best that industrial life owes to any individual under ideal conditions is steady employment from which he may earn a living for himself and for his family at work which is congenial to himself and useful to the rest of the world; an opportunity to rise to higher and higher places of responsibility commensurate with his ability and industry; an income sufficient to admit of his laying up of a fair part, large enough to care for him in sickness or old age, and provision that his work shall be wholesomely interspersed with periods of rest and recreation.



# Six-Cent Fare Disallowed for Bay State

Massachusetts Public Service Commission Sanctions Higher Rates for Country Lines of Bay State Street Railway but Retains Existing 5-Cent Fare for Principal Cities—  
Tells How to Secure More Revenue Through Increased Efficiency  
and Larger Co-operation on Part of Public

ON Aug. 31 the Massachusetts Public Service Commission handed down a decision, which is abstracted below, ordering the Bay State Street Railway, Boston, Mass., to cancel the proposed schedule of increased fares which has been before the board since Sept. 7, 1915. A preliminary notice of this decision was published in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2. In brief, the changes proposed by the company were: (1) A general increase in the unit cash fare upon all lines from 5 cents to 6 cents; (2) an increase in certain local fares from 5 cents to 8 cents; (3) the sale of nine tickets for 50 cents, each ticket good for a single cash fare in certain city districts; (4) the modification of certain existing fare zones; (5) the modification of certain transfer privileges, and (6) the withdrawal of all existing reduced-fare tickets other than half-fare tickets required by law for school-children. The company estimated, on the basis of its operations in the fiscal year 1914, that these changes would yield an increase of nearly \$1,250,000 or about 14.5 per cent in passenger revenue. This estimate assumed traffic losses on the various lines, due to the increased fares, ranging from 5 to 20 per cent and a 60 per cent use of tickets in the city districts.

On June 30, 1914, the company operated 951 miles of single track and owned 897 miles in Massachusetts. The total area served was 1528.6 square miles and the average population per square mile 873.8. The system furnishes a composite of city and country service. The company is the successor of sixty-three street railways which have been consolidated. Practically all the common stock is held by the Massachusetts Electric Companies, an unincorporated association, but a relatively small amount of preferred stock outstanding is held by the public.

## FRANCHISE CANNOT RESTRICT FARES

In many instances the locations in public ways which the Bay State company now holds were originally granted to predecessor companies on condition that the fare charged for any ride within certain limits should not exceed 5 cents. In the Middlesex & Boston case (2 Rep. P.S.C. 105) the commission ruled that such conditions are not valid as against the rate-making power vested in the board by the public service act. This has recently been affirmed by the Supreme Court of Massachusetts in *Board of Survey of Arlington vs. Bay State Street Railway*, decided June 21, 1916. The legal right of the commission to permit a fare increase, notwithstanding the terms of local franchise grants, is thus clearly established. The commission holds that even in the cases of Lowell and Fall River, whereby certain fare limitations were established by direct legislative enactment, the board's power to act is not affected.

## REVENUE NEEDED FOR A 7 PER CENT RETURN

The company claimed that it is justly entitled to a fare increase because its revenues are insufficient to pay operating expenses and taxes, provide for depreciation and yield a reasonable return upon the investment. The total investment claimed by the company was \$42,-

987,405 (including \$1,424,097 working capital). The company urged that it needed \$1,578,648 additional yearly revenue to pay a 7 per cent return upon the above investment and meet operating expenses and fixed charges, the total revenue for 1914 (fiscal year) being but \$9,092,077. The total revenue needed was made up of the following items: Variable expenses, \$5,993,505; taxes, \$604,957; depreciation in addition to present maintenance charges, \$1,063,145; interest on investment, \$3,009,118; total, \$10,670,725.

The decision reviews at length the inventory of Sloan, Huddle, Feustel & Freeman, consulting engineers for the company, which established \$41,563,308 as the total original cost of the property on Nov. 1, 1914. The addition of working capital to this gave the total investment of \$42,987,405. The total outstanding capitalization of the company in 1914 was \$49,431,500, composed of common stock, \$21,035,900; preferred stock, \$2,748,600; funded debt, \$23,747,000, and unfunded debt, \$1,900,000. The difference between the engineers' estimate of the investment and the total capitalization is \$6,444,095. The capitalization in part represented discount on bonds amounting to \$1,251,010 and replacements in suspense amounting to about \$750,000. Premiums amounting to \$1,414,680 were paid in at various times on new stock issues.

## COMMISSION CRITICIZES THE INVENTORY

In the opinion of the commission, the method of determining original cost used by the company experts creates an impression of accuracy which is not wholly warranted. Ties, ballast, building foundations and other items are in whole or in part buried in the ground. Nor can the amount of street grading when the track was originally laid be determined with accuracy by present inspection. Information in regard to these matters the engineers were forced to obtain from the imperfect records of the company, supplemented by statements of its officers. The same difficulty was experienced in determining property ages, and even less accuracy was possible in the case of unit prices in earlier years. The difficulty was enhanced by the fact that the promoters of many of the original roads were at the same time their builders, doing the work under contracts which were largely a matter of form. Without disparaging the work of the engineers, the commission holds that it calls not infrequently for the drawing of general conclusions from fragmentary evidence.

Much difficulty was experienced in checking the unit prices which were used. The results of the investigation, however, tended on the whole to check the unit prices used, although they showed the somewhat speculative character of many of the prices and the meagerness of the data upon which it was at times necessary to base conclusions. The chief engineer of the commission, H. W. Hayes, estimated a net reduction of about \$600,000 in the total estimate of original cost. No criticism is intended by the commission of the work of the engineers, for it is doubtful if more satisfactory evidence could be obtained. So far as the evidence relates to prices for labor and materials within the last



ten years, the records are fairly complete, and the company has, the board feels, in general sustained the burden of proof. On the facts before the commission, the same must be said of all the prices of land, cars, car and power station equipment. The data in regard to buildings and paving, also, are detailed, and have not been challenged by the remonstrants. The best judgment of the commission is that the company's engineers did not attach sufficient weight to the low labor and material costs prevailing in the nineties, or to the imperfect and cheap character of street railway construction during that period.

#### OVERHEAD CHARGES HELD TO BE EXCESSIVE

Of the total investment value of \$41,563,308 estimated by the company's engineers, \$4,721,674 covers overhead charges. These average 12.74 per cent of the direct property cost and are assigned by the company as follows: Engineering and superintendence, 3.68 per cent; interest during construction, 2.23 per cent; taxes during construction, 0.12 per cent; insurance during construction, 0.48 per cent; organization and legal expenses, 3 per cent, and contingencies, 3.23 per cent.

The commission points out that the above percentages are based not upon records, but upon judgment. A considerable number of these costs were incurred during the construction of the constituent companies and were outstanding capital obligations at the time of the consolidations. As a test of overhead expenses in earlier construction, the commission's accountants selected at random from the board's files thirty appraisals or estimates submitted in capitalization cases from 1890 to 1900. In these appraisals no overhead charges were noted save engineering and superintendence in the cases of roadbed, track and overhead system. These amounted on the average to 2.19 per cent of the total cost of these property items.

The commission realizes that much overhead expense in the past and even recently has not been segregated in the records, but it believes that the company has failed to sustain the burden of proof in this matter and that its estimate considerably exceeds the reality. The present Bay State system has grown slowly and a large portion of its cost represents additions and improvements to already existing property, a fact which has tended to lessen interest during construction. Much of the engineering and superintendence, especially in the past, has probably been supplied by officers whose salaries were charged to operation, and this is no doubt true of other overhead expense. The item of contingencies the commission believes has been considerably overestimated. In this case, therefore, the commission finds that 8 per cent is a liberal allowance for overhead charges. Assuming that the engineers of the company overestimated the direct cost of the property by \$600,000, the total estimate for overhead expense on this 8 per cent basis is \$2,899,330, instead of \$4,721,674.

#### WORKING CAPITAL AND REVISED ORIGINAL COST

The company allowed \$1,424,097 for working capital, defined as cash on hand and money invested in stores and supplies, the figure used being based on the average of these items during the past five years. The remonstrants urged that no such amount is needed or should be allowed as a part of the investment, emphasizing the point that the company collects its income more frequently than it pays its bills. The commission points out that in 1909 its predecessor, the Massachusetts Railroad Commission, authorized the Boston & Northern and Old Colony companies (now the Bay State) to issue securities to supply \$1,141,375 working capital, and therefore sets this standard for the present case.

Making the above revisions, the commission has set the fair original cost of the existing tangible property in Massachusetts, including working capital, at \$40,282,340. The commission figures that \$39,104,340 represents the amount which must be used as the basis of fixing passenger fares in Massachusetts, after taking out \$600,000 on unit prices; \$1,822,343 on overhead charges; \$282,722 on working capital; \$293,000 on unused property and \$885,000 on property leased to the Boston Elevated Railway.

#### CLAIMS FOR INTANGIBLE VALUES

No evidence was introduced by the company to substantiate its claim of intangible property, but claims were made for reward for promoters' services, the cost of securing money and the cost of the development of the plant. The first claim is that a certain amount of over-capitalization was necessary in order adequately to reward promoters and that initiative for the future will be destroyed unless capital allowance for such services in the past is taken into account. Such evidence as the commission has in regard to "water" in the Bay State capitalization indicates that it was injected largely during the process of electrifying roads which had long since passed the promoters' stage. In the main, the promoters of the newer enterprises seem to have sought their reward in the shape of construction contracts, and it is probable that they also reaped additional profit from enhancement of land values. There is no evidence, the commission states, in the records of capitalization cases in the past that issues of securities were either allowed or sought to have commissions for bankers.

Regarding development charges, the commission concedes that a reasonable opportunity should be given to spread the loss over the earnings of succeeding years, but such a policy cannot be continued indefinitely. Electrification took place over twenty years ago and the process of consolidation more than ten years ago. No doubt much property was abandoned in the process of electrification, but the amount has been exaggerated. In the absence, at least, of tangible evidence in regard to the amount, character and time of abandonment of property, the commission is of the opinion that no allowance for such property should be made.

Indirectly, a claim for land appreciation was made even prior to the filing of the brief of the company, the appreciation amounting to \$648,502. Later, at the request of the board, the cost figures were substituted. Car riders, however, cannot be expected to pay higher fares because land has increased in value, nor ought they to pay lower fares if it should decrease. Even if the doctrine of present worth were accepted, the figure to be used in rate-making would clearly be present worth for street railway purposes, and in this case no evidence has been submitted that the land has increased in value for such purposes.

The remonstrants claimed that the original cost estimate includes all the existing property, whereas a substantial portion was paid for out of income and therefore not invested by either stockholders or creditors. Under the looser methods of bookkeeping which have prevailed in the past, capital expenditures could be concealed by including them in operating expenses with the maintenance charges. In the sixteen years in which the Massachusetts Electric Companies have controlled the Bay State system, however, the evidence points to no such padding of the maintenance accounts. The tendency has been to capitalize expenditures wherever possible and to distribute the maximum possible dividends.

The commission does not feel that the theory



of the remonstrants can be applied to the Bay State company, in view of the history of the property.

#### DEPRECIATION AND DIVIDENDS

The commission rules that in determining the revenues to which the company is entitled, allowance should be made for an amount equal to a fair return upon all the capital honestly and prudently invested, without deducting accrued depreciation. Upon the basis of the Feustel figures the property had depreciated 31.1 per cent, representing about \$12,000,000, but the company claimed that insufficient earnings have been received to enable it to make proper provision for depreciation. In making the above ruling, however, the commission states that it must not be understood as deciding that the company can, if it earns the amount to which it is entitled, properly pay dividends before the depreciation and other deficits from past operation are made good. In the Blue Hill case (3 P.S.C. Rep. 75) no dividends whatever had been paid by the company, and no deduction was made for depreciation in estimating the fair basis of return.

A more difficult question arises in the case of a company which has paid dividends and which has neglected to provide adequately for depreciation. It is doubtless true, the commission feels, that it would not now be regarded as sound business practice for a public utility to pay any dividend whatever at the expense of adequate provision for depreciation, but in dealing with the past transactions of street railways it would in many cases work injustice if the rule were inflexibly applied that a company which has failed to make adequate provision for depreciation ought to have paid no dividends whatever. The average dividend paid by the Bay State and its predecessors from 1862 to 1900 was 4.07 per cent. Even if the amount of excessive capitalization is eliminated and the return is figured on the actual legitimate investment, the dividends paid by the company in the past average less than a fair return upon the money actually put into the property.

During the time when these dividends were being paid no attempt whatever was made, the commission states, to provide for future depreciation by creating a reserve until the regulations of the Interstate Commerce Commission, two years ago, made it necessary to set aside something for depreciation on rolling stock. President Sullivan testified that he realized when he took up the management of the system in 1899 that in future years the amounts necessary for renewals would increase sharply, but he and his associates considered it sound policy to make renewals when necessary and relied upon the future increase of revenue to cover all contingencies.

The Bay State system is made up of a large number of city, suburban and interurban lines, some of which were nearly forty years old at the time of consolidation. There may have seemed at the time some justification for the view that the property had reached a condition where the renewal requirements of successive years would not vary greatly in amount, or at any rate, would not increase more rapidly than the growth of traffic. Under the circumstances, the Bay State company should not be criticized too severely for adopting a policy which was in conformity with the prevailing standards. The dividends paid have not been large, and under the Massachusetts laws a company which is not paying dividends finds it difficult to finance its needs. Nevertheless, the commission holds that the company should cease paying dividends on its common stock until current repairs and renewals have been completed, with the replacement of obsolete equipment. While this ruling may seem harsh to stockholders who have at best re-

ceived only a moderate return, the board is convinced that it is not only in the general public interest but in the interest of the investors that a larger portion of the earnings shall be put back into the property.

In determining the depreciation provision the engineers of the company first eliminated all property, such as land, which does not require eventual replacement. All overhead charges were considered depreciable except those for organization and taxes during construction. The board concludes that half the annual depreciation allowance should be estimated on the straight-line basis and half on the sinking fund basis, instead of on the all straight-line plan, as figured by the company. The commission finds that \$1,044,374 may be properly allowed for depreciation annually.

#### DISCUSSION OF FAIR RETURN

The company claims that it is justly entitled to a return of 7 per cent upon the full amount of capital found by the commission to have been honestly and prudently invested. Past experience with Massachusetts public utilities give little ground for the claim that the above return is essential to attract capital. Stock of fairly capitalized and well-managed properties, even including street railways, has frequently been issued, taking premiums into consideration, upon better than a 6 per cent basis. The commission states that the company is asking not only for a 7 per cent return but for funds sufficient to make provision for depreciation such as no other street railway in Massachusetts has ever hitherto made. The provision for depreciation which is allowed and the fair rate of return must be considered together, the board holds, and so concludes that a 6 per cent return should be ample.

Assuming a charge of 4.7 per cent for money borrowed, this will leave 7.3 per cent for the portion of the investment represented by capital stock. In fixing this rate the commission emphasizes the point that it must not be understood as declaring that a street railway which finds it possible to declare dividends in excess of 7 per cent may reasonably be required to reduce its charges. Each case must be judged upon its own merits. Due consideration in the present case has been given to the fact that the company's dividend policy has lost it the right to claim an enhanced return which it might have had if a more conservative program had been followed.

#### MAKING UP THE EARNINGS DEFICIENCY

Making the various corrections and deductions specified by the board, it appears that the net earnings applicable to dividends amount to \$1,757,444, or about 4.5 per cent, on the amount of investment to be used as the basis of reasonable rates. The deficiency below the 6 per cent return found to be reasonable is \$588,816. Yet in view of the provisions of the statutes under which the Bay State consolidations were effected, in view of the circumstances leading up to them, and in view of the little community of interest between certain parts of the system, it would, in the judgment of the board, be an injustice to the many populous communities which the company serves to regard its system wholly as a unit for rate-making purposes. This does not mean that every line should be required to pay its own way. It may be conceded that the communities in which the company earns the major part of its divisible income must expect in some measure to bear the burden of tributary lines which cannot support themselves. This, however, does not mean that the full burden of carrying the "speculative" properties in sparsely settled territory, which were made a part of the system sometimes hastily and with the assumption that econo-



mies would necessarily follow from consolidation, must be borne by the better-paying communities.

At the request of the remonstrants, the territory served was divided into fifteen districts regarded in general as having some community of interest, and the company's engineers regrouped their figures showing the estimated surplus or deficit from operation on the ninety-five operating "routes" as submitted in the company's evidence. The regrouping was then refigured by the commission, using the amount fixed by the board as the present basis for passenger fares and the corresponding depreciation allowance. With the exception of the Gloucester, Newburyport and New Bedford districts; all showed a surplus on the investment ranging from 0.38 per cent to 8.35 per cent.

#### SIX-CENT FARE IS UNPOPULAR

The results of fare increases from 5 to 6 cents on Massachusetts street railways have been disappointing, in the opinion of the board. The 6-cent fare unit is admittedly awkward and unpopular. Conditions in parts of the Bay State territory seem peculiarly unfavorable to the increase. General Manager Goff testified that under the proposed schedule fares between some points, especially in the Boston metropolitan district, would in some cases exceed even the steam railroad single fares, and would generally be about double the commutation rates. Further, the centers of larger population are in general mill and factory cities, with comparatively short average haul. In such localities walking is a form of competition not to be ignored. So far as the board is advised, no attempt has been made elsewhere to increase the 5-cent unit, in cities at least, although in many cases it has been reduced by ticket concessions. The tendency in other parts of the country, in the main, is clearly to meet the new difficulties by inviting additional traffic through faster, better or generally more attractive service, or by decreasing expense through improved operating methods. Encouraging progress has been made in recent years in both directions.

#### HOW TO SECURE GREATER EFFICIENCY OF OPERATION

The decision reviews various points discussed in the report of Bion J. Arnold to the board upon possible increases in the operating efficiency of the Bay State company. The commission concludes that the moderate increases in speed recommended can be effected, and suggests that the general problem of speed increase be given higher executive attention and specialized skill. Reduction of service in short-haul urban territory is doubtful wisdom, but the board holds that this can be done effectively on some of the longer interurban lines where the traffic is light, especially at certain seasons of the year. The later rolling stock is praised by the commission, but emphasis is laid upon the need of repairing, cleaning and painting the older cars. The decision points out that the Bay State company has 984 open cars in use out of a total of 1996 cars in service, and points out that while the open car has been popular in the East, it is an expensive luxury. It involves a duplicate investment, greatly increased maintenance expense, increased accident hazard, loss of fares and hardship to employees. The semi-convertible car can be made nearly as attractive to riders, and is far more economical. The gradual retirement of open cars is recommended.

The commission also points out that with the new equipment fare boxes could also be used, and states that it is significant that almost alone of the great systems of the country the company has not at present a single prepayment car. (Exception should be made of the latest type of semi-convertible car designed by the company, which furnished the basic design for 200 new

cars lately ordered.—Eds.) The change in equipment would also facilitate the introduction of trailers, which at present are not used at all, although the use of double-headers is frequent. The economy of properly designed trailers, even though they require the construction of additional loop tracks, is now well established. Regarding one-man cars, the company is of the opinion that these can be used on certain routes. The company cannot be held responsible for any failure to use one-man cars up to the present, as the commission has previously regarded this practice with disfavor. The board states that it is willing to give this matter renewed consideration without prejudice, in view of possible recent improvements in this type of car and methods of control.

The commission favors the installation of additional feeders. It is also inclined to believe that some substantial saving in general expense can be attained through methods of organization. The commission is convinced that the interurban lines are in but a rudimentary stage of development at present, and that they hold forth the possibility of largely increased traffic, provided they can in some way be made to furnish more expeditious and more convenient service. The prospects are also more hopeful than ever for the development of trolley freight service along broader lines. The company has in mind the extension of this service into the territory north of Boston, where the population is larger, the freight service of the railroads subject to many delays, and where much market-gardening exists. Through charging admission to parks and through the sale of unused real estate, the company may possibly increase its resources. The commission feels that new shops and other improvements could be capitalized on a paying basis.

#### CO-OPERATION OF THE PUBLIC

The economies which have been suggested, however, cannot be carried into effect without the co-operation of the public. Excessive taxation in connection with paving requirements is a serious burden to the Bay State company. In securing new locations involved in the laying of double track, reduction of curves, etc., the company has continually been obliged to negotiate with the local authorities and finally to agree to perform work upon the streets which the statutes do not require or even contemplate.

The decision points out that it is natural that municipal governments, anxious to keep down the local tax rate by which they are so largely judged, should seek to unload upon the street railway all possible expense, but that such a policy, in the long run, reacts upon the public served. Any burden or tax imposed upon the company the car riders ultimately must pay. Further, the burden is not measured wholly by the cost of the physical work which the company is finally required to do, for the continual dickering over such matters consumes a large amount of time and adds materially to the cost of management. The cost of the paving alone for which the Bay State company has paid since 1898 and which it has been expected to maintain, is estimated at more than \$2,000,000. In a report to the 1916 Legislature, the commission strongly urged that the present system should be changed by eliminating, in effect, the present "commutation tax," by placing all paving work squarely in the hands of the municipalities, and by requiring the street railways to meet only the reasonable cost of any such work done within their track locations. The companies ought not to be required to pay the present "commutation tax" and at the same time to do the work for which this tax was supposed to be a substitute.

The elimination of many of the present indicated stops and the decreasing of headway on overserved lines



are also strongly advised by the commission as further means of increasing revenue. Better traffic regulation through police co-operation is also considered advisable. The commission states that in the past small concessions have been withheld by the public, when these ought, in the larger interest, to have been granted, and petty restrictions have been unwisely imposed. The commission now believes that if the company makes any serious and comprehensive attempt to improve operating conditions, it will not find the public lacking in co-operation.

#### RURAL FARES MAY BE INCREASED

The commission states that the weakness of the Bay State situation arises from original error of judgment in the too hasty combination, on an equal basis, of all sorts and conditions of companies without any adequate consideration of the fact that some of the older properties had suffered in capitalization and in physical condition from the operations of certain predatory syndicates, and that many of the newer properties were manifestly speculative in their nature and constructed in territory where the hope of any early return was exceedingly small. Coupled with and accentuating this error was the inflation of the shares of the holding company used in bringing about the combination. From this initial handicap the system and its managers have continually been suffering and they have faced a difficult and oppressive situation in which they have not been wholly free agents. As President Sullivan has stated the property has never at any time been in a "normal" condition.

If the company and the public will each do its share toward the relief of present conditions, however, the prospects for the future cannot be considered unfavorable. The public can reasonably be expected to make contribution in the form of some increase in fares. The proposed new schedule cannot be allowed, as the commission finds no evidence which would justify it in permitting the regular unit of cash fare to be increased in the populous centers which are already carrying their fair share of the burden. The board also has grave doubt whether an increase in the 5-cent unit in this thickly-settled, short-haul territory where jitney competition is so feasible and so prevalent would be of material benefit to the company. Any increase in the unit cash fare is therefore disallowed in the present 5-cent zones within or from the centers of the following cities: Boston (including Hyde Park), Brockton, Chelsea, Everett, Fall River, Haverhill, Lawrence, Lowell, Lynn, Malden, Melrose, Quincy, Revere (town), Salem and Taunton. These are roughly the districts in which the company had proposed to sell nine tickets for 50 cents. The 5-cent zones radiating from these centers include, in whole, or in part, adjoining municipalities, such as Beverly, Peabody, Saugus and Swampscott.

The other lines of the company, in general, form part of the interurban routes and are located in the less populous districts. If the company wishes to increase the prevailing fares on these lines, it is just and reasonable, in the board's opinion, for it to do so. In its schedule the company had in certain cases provided for increases beyond a 6-cent fare unit, had introduced certain new fare zones and altered existing transfer privileges. The commission has not been able, from the evidence submitted by the company, and for lack of time, to deal with such changes in the present proceeding.

For the reason mentioned and because such fare increases would in any event yield a small increase of revenue and might cause serious hardships to certain small groups of riders the board is of the opinion that

no changes of this character can be allowed at this time. The company is, however, authorized to file a new schedule, to become effective within thirty days after filing, of rates, which schedule, upon approval by the commission and proper notice, will be allowed to become effective without further hearing. With respect to reduced fare tickets, the commission doubts its authority to require the company to put into effect or continue concessions over the regular rates. After one year under the new schedule the commission will be prepared to consider further revision of rates if this is proved to be necessary.

## COMMUNICATION

### Public Relations Outline Commended

FORD, BACON & DAVIS, ENGINEERS

NEW YORK, Sept. 6, 1916.

To the Editors:

I have read with much interest the outline of important methods of improvement of public relations, which is published in this week's issue of the *ELECTRIC RAILWAY JOURNAL*, and I want to congratulate you not only upon its completeness and value but also upon the crisp form of presentation.

This schematic plan of presenting the subject is one that carries an appeal to the human understanding, both by its brevity and its logical form. This outline will form a very valuable supplement to the code of principles prepared by the public relations committee of the American Electric Railway Association several years ago.

FRANK R. FORD.

### Floral Tribute to Superintendent Bolen

A FEW days ago nineteen social clubs composed of trainmen on several parts of the system of the Public Service Railway of New Jersey recognized the completion of thirteen years of service with the company by General Superintendent N. W. Bolen in a remarkable manner. The recognition took the form of a floral shower, comprising trolley cars, large horseshoes, bou-



MR. BOLEN SURROUNDED BY FLORAL TRIBUTES

quets and other set pieces. Accompanying the floral pieces were signed testimonials tendered by a number of the social clubs extending best wishes for the continued leadership of Mr. Bolen. The accompanying half-tone shows some of the contributions. One of his associates describes the occasion thus: "It certainly was a great day for 'Boss Bolen' on the Public Service system."



# Another Strike Hits New York

Indications Are, However, That Strike Is Broken—Interborough Subway and Elevated Lines, the Primary Objective, Are Operating Normally—Individual Working Agreements the Main Cause of Trouble

THE long-threatened rapid transit strike has at last occurred in New York, but unless unforeseen developments arise the residents of the city will not be seriously inconvenienced. On Wednesday night, Sept. 6, about 2000 disgruntled union employees of the Interborough Rapid Transit Company voted to strike because the company refused to cancel individual working agreements with more than two-thirds of its employees, and at the same time employees of the New York Railways, the surface lines controlled by the same management, walked out for reasons much in dispute. According to the latest reports, the surface line service is disrupted but steadily improving, while the subway and elevated services are operating in excess of the normal amount through the loyalty of more than 9000 of the 11,000 employees. Unless the labor interests succeed in calling out all other surface lines in Manhattan, the Bronx, Queens and Richmond, and the Brooklyn Rapid Transit Company as well, the strike seems certain to fizzle out in short order.

Fundamentally the whole cause of the present situation seems to be the individual contracts which the Interborough company has secured through the voluntary act of most of its employees, and which the New York Railways is now distributing among its men. The former contract was published last week, and the latter, differing only in its time limit, appears elsewhere in this issue. The way in which the New York Railways has been drawn into the rapid transit dispute, in spite of the elaborate arbitration clauses of the agreement reached on Aug. 7 in settlement of the earlier strike on these surface lines, is quite complicated. The union men allege that they were given to understand that the policy of this settlement, covering the right to organize, treatment with committees and arbitration of disputed points, would be followed out in the case of the Interborough lines as well as the New York Railways, but that when they wished to arbitrate the fairness or unfairness of the individual working agreements and the question as to whether the methods used in obtaining them were a breach of the settlement plan, the Interborough general manager, Frank Hedley, refused. Consequently, when they learned that the New York Railways was contemplating the issuance of similar working agreements for its men, they did not pursue the stipulated course and ask Mr. Hedley as general manager of the surface lines to arbitrate the contract question, but voted to follow the Interborough men in striking.

The Interborough officials, on the other hand, deny the existence of any agreement comparable to the New York Railways settlement, and aver that they could not arbitrate all the Interborough contracts that had been already voluntarily signed through the exercise of a

## THE ISSUE

*As Stated by the Company*

"There is just one issue involved in the proposed threat to tie up the street railways of New York:

***"Shall the Interborough Company be compelled to cancel and annul contracts, creating improved conditions of employment, voluntarily entered into between the company and more than 8,000 of its employees?"***

constitutional right, especially when the Interborough unionists voted to strike in an effort to coerce the company into cancelling the contracts. Moreover, the company says, in going out on strike the New York Railways men deliberately violated the settlement plan of Aug. 7, and this is no longer operative.

### WORKING AGREEMENT AND CONFERENCE OF AUG. 30

The dispute between the Interborough Rapid Transit Company and its union employees began to assume a critical form on Thursday, Aug. 30, when at a conference regarding union demands Mr. Hedley introduced a printed copy of the working agreement that for several days had been circulated among the individual

employees. This working agreement, as stated in the ELECTRIC RAILWAY JOURNAL of Sept. 2, was formulated in conference with the committees representing each of the departments of the road, and these committee said that they would recommend the terms of the agreement for execution by the individual employees. Although these agreements, carrying with them \$1,250,000 in increased wages, concessions in working hours and stable conditions for about two years, were being voluntarily signed by more than two-thirds of the 11,000 Interborough employees, the minority union interests immediately asserted that they constituted an attack on the right of collective bargaining and their circulation must be stopped.

Moreover, at this conference the question was immediately raised as to whether the employees of the Interborough Rapid Transit Company had a legal and a moral right to organize. In regard to the attitude taken by the company representatives, Mr. Hedley after the conference issued a statement in part as follows:

"I said that I would be glad to hear the grievances or demands of the employees on the assumption that the principles which had been agreed upon in so far as the New York Railways was concerned would also apply to the Interborough Rapid Transit Company. The New York Railways agreement provides that committees of the men have a right to have their individual committeemen, if they desire represented also by spokesmen, appear before the officers of the company to present their cases and, further, that should disputes arise with the management which cannot be settled with the employees, the questions in dispute shall be arbitrated, excepting, however, all matters relating to efficiency. Of course, the same procedure will be followed on the Interborough lines."

### STRIKE ORDER VOTED BY INTERBOROUGH UNIONISTS

To such an extent did the individual working agreements stir up the union leaders that a strike meeting of



Interborough unionists, numbering, it was asserted, about 3000, was held on Friday night, Sept. 1. The men then voted that an ultimatum should be presented to the company on Tuesday, Sept. 5, the date set for the next conference. The resolutions passed demanded forthwith the return and cancellation of all such individual working agreements as had been signed, and stated that "in the event of the failure of the company to return and cancel said contracts and upon their refusal to do so, we authorize, empower and instruct our officers and executive board to take such steps as they may see and deem fit and proper; and, if in their judgment they deem it expedient and advisable, to call forthwith a suspension of all work on the lines of the Interborough Rapid Transit Company."

It was directed, moreover, "that a copy of this resolution be delivered to Division 722 of the Amalgamated Association of Street and Electric Railway Employees of America, the members of which division are employees of the New York Railways, which is owned, operated and controlled by the officials, board of directors and management which owns, operates and controls the Interborough Rapid Transit Company, with the request that they co-operate with us to obtain our just and proper rights."

#### INTERBOROUGH REFUSES TO CANCEL CONTRACTS

In advance of the conference scheduled for Sept. 5, Theodore P. Shonts, president of the Interborough Rapid Transit Company, announced that the company would not annul the individual working agreements with the vast majority of its men. In a statement issued on the evening of Labor Day, Sept. 4, Mr. Shonts said that his position as president of the company was that these contracts were entered into voluntarily by the men and officers of the company, that they were binding upon both parties, that they could not be abrogated by either without the consent of the other, and that in making the same, both parties were exercising the right of liberty to contract guaranteed by the Constitution. It was, therefore, obviously impossible to comply with the demands of the minority represented by the officers of the union. He emphasized the fact that there was nothing involved in the controversy except the right of the employees of the Interborough to form their own brotherhood and the right of the company and the members of the brotherhood to enter into contracts respecting rates of pay and hours of labor.

The position of the company was further set forth in large advertisements sent to the newspapers on the evening of Sept. 4, summarizing the recent negotiations between the company and its employees. Along with other things it was explained therein that conferences between the company and the committee of employees selected under its own brotherhood plan took place before any other committee, union or otherwise, had presented any requests whatsoever. In order that there should be no mistake, and that the company might know definitely that the new schedules were satisfactory to the men, a contract was prepared for submission to each man individually. No man was asked to sign by any one selected by the company, or by any man with authority over others. Submission of agreements to the individual men was handled entirely by elected representatives of an overwhelming majority of the men, and they had up to that time been signed by more than 8000 of the employees.

Mr. Shonts also gave out a letter that had just been sent by Mr. Hedley with his approval to Mayor Mitchel, asking that in the event of the threatened strike materializing, the company be given immediate police protection. A copy of this letter had been forwarded to

Governor Whitman, "in order that if a strike with all its disorder should come and the police be found inadequate to cope with the situation, and we ask the militia be sent, the authorities could not say they had not been informed of the seriousness of the car situation."

#### WARNING NOTICES ISSUED TO EMPLOYEES

At this same time notices were sent out to Interborough employees explaining why the company would not annul the working agreements as demanded by the union and warning them that all those who either encouraged or participated in a strike or interfered with the freedom of their fellow-employees or with the peaceful and continuous operation of the road, would not be entitled to the benefits secured by the contracts or to those accruing under the rules of the company from seniority of service, and that all employees who absented themselves from duty because of a strike order

#### WORKING AGREEMENT

1. *The New York Railways employs the undersigned for the wages and hours set forth on the annexed schedule from Sept. 3, 1916, to Aug. 31, 1918.*

2. *The undersigned agrees to work for the company in such positions as may be assigned to him from time to time (provided there shall be no reduction in position except for good cause) for such wages and hours for such periods.*

3. *It is further agreed that if the company shall increase the wages or change the hours set forth on the schedule, the undersigned shall have the benefit of such increase or change notwithstanding this agreement to the contrary.*

4. *If, after five years' service in any one class, for physical causes beyond the control of the undersigned, he shall be assigned to a lower position, he shall then receive at least the low rate wages on the schedule of the class from which he is transferred.*

Dated New York City, 1916.

NEW YORK RAILWAYS,

By FRANK HEDLEY

Vice-President and General Manager

.....  
Employee

Pass No. ....

#### NEW YORK RAILWAYS INDIVIDUAL SERVICE CONTRACT

would be dropped from the company's service, and if re-employed at a later date would be taken into the service as new men.

In view of the co-operative aid that the union strike resolutions had asked of New York Railways employees, a similar notice was sent to these, admonishing them that they were bound by the formal settlement of Aug. 7 and that any sympathetic strike would be a breach of that agreement with the company. They were notified that any strike activity or any absences on account of a strike order, or otherwise, would result in a discharge from the company's service. If re-employed at a later date, the discharged men would be taken back as new employees.

#### CONFERENCE ON SEPT. 5 FANS THE FLAME

The scheduled conference on Tuesday, Sept. 5, between Mr. Hedley and leaders of the union served only to show that the company intended to keep its word in refusing to annul the individual working agreements. Although the labor leaders had the power to call a strike at once, they did not take advantage of it but decided, after notifying Mayor Mitchel of the deadlock, to pass the responsibility for calling a strike back to the In-



terborough union employees at a mass meeting on the evening of Sept. 6.

At the conference company officials stated that if the working agreements were thought to have been illegally obtained, their validity could be ascertained in court. The union leaders offered to arbitrate the question as to the fairness or unfairness of the working agreements and also the methods that were being used in getting the men to sign the same. To this the company would not agree.

The labor leaders then offered to submit the whole matter to the Public Service Commission and the company also refused that, claiming that the commission had no jurisdiction in the matter. It was pointed out by the company that if the working agreements were to be tested, the act should take place before a tribunal where perjury could be punished. The company representatives were disinclined to discuss any points beyond the refusal to annul the agreements, inasmuch as it was reported that the labor leaders had threatened a general tie-up from the Bronx to Coney Island. Counsel for the union men, however, denied that they had made such a threat.

At the above-mentioned conference the question of the union demands for the New York Railways was also taken up, and the company representatives were asked whether they had proposed for the employees of this company any working agreement similar to that used for Interborough men. While insisting that nothing whatever had been done which by any chance could affect in any respect the settlement agreement of Aug. 7, company officials stated that a similar agreement had been discussed and drawn up, but that they had determined to withhold any distribution of such contracts for the present.

According to statements of the union leaders, however, the suggestion and discussion with reference to the advisability of getting all of the New York Railways employees under contract had taken place not only subsequent to Aug. 7, the date of the New York Railways settlement, but also after the conferences were begun between the officials of the company and the committee of employees and their spokesman in accordance with the settlement plan.

#### NO AGREEMENT BETWEEN INTERBOROUGH AND ITS MEN

After the conference Mr. Shonts issued a statement in part as follows:

"There is and has been no agreement between the Interborough Rapid Transit Company and the Mayor and Chairman Straus covering relations between the company and its employees. The only agreement between the Interborough and any of its employees is the individual 'working agreement' signed by the company and now more than 8500 of its men.

"With that agreement the Amalgamated Association has and has had nothing to do. It was the outgrowth of conferences between this company and representatives duly chosen by the vote of an overwhelming majority of the employees. It is these agreements which the union officers—representing but a small minority of the men—ask us to cancel. We have received no such requests from the men who did sign.

"The employees of the Interborough have formed a brotherhood of their own, and have manifested in a variety of ways their desire to deal with the company independently and to be free from the attempted invasions upon their work and freedom. The whole situation involves an effort by the outside union, of which but a minority of our men are members, to create an issue, whereby through strike, or threats of strike, the

majority of our men shall be compelled against their will to join the outside union."

#### THE STRIKE FINALLY IS CALLED

The first step in the impending strike finally was taken the evening of Sept. 6, when mass meetings of the union employees of the Interborough Rapid Transit Company, covering the subway and elevated lines in Manhattan and the Bronx, voted to quit service at about 9.30 p. m., and about 11 p. m. the unionized strength of the New York Railways, operating the "green-car" or one of the two big surface systems in Manhattan, followed suit. About midnight the surface lines suspended service for the night, but the rapid transit lines continued to operate with little delay.

On Thursday morning, Sept. 7, New York awoke to learn that what it has been fearing for weeks had come to pass—i.e., a strike on the rapid transit lines or main arteries of travel in Manhattan and the Bronx. Yet only from the newspapers was this in general discernible, for through the support of more than 9000 of loyal employees and some of the 3000 emergency workers which it had gathered in its carhouses and at its terminals, the Interborough company was able to offer normal service. At the time of the strike the company had received 9264 signed working agreements, and only twenty employees thus represented failed to report in the morning for duty. Only three motormen on the whole rapid transit system struck.

On the New York Railways about 2500 of the 3300 men went out. From early morning, however, when service was resumed, operation gradually improved. At 7 a. m. the company had 70 cars in operation; at 8 a. m., 143 cars; at 9 a. m., 157 cars, and at 10 a. m., 179. This latter figure, which was maintained during the day, was 25 per cent of the normal service.

The board of directors of the New York Railways voted increases for the men who stuck by the company. A new scale, with individual contracts for two years, is being offered to these men. The increases voted amount to \$350,000 a year. Up to 10 a. m. 409 of the surface car men had signed the individual contracts. Double pay until further notice was also announced by Mr. Hedley for both Interborough and New York Railways employees who remained loyal and signed the individual working agreements.

The subway and elevated lines were operated all night Thursday, but the surface-car traffic was halted at dusk until Friday morning. In the face of the great set-back, the union leaders declared they would hit at the Interborough through the power houses, but Interborough officials reported that every one of its power house employees had signed the individual contracts. In consequence, the company declared, it had no fear of a strike call among its power house employees.

#### STRIKE SEEMS TO BE FIZZLING OUT

At the time that this paper went to press, it was evident that the rapid transit strike had failed, more than normal service being operated, and the only inconvenience suffered by the public is the partial suspension of service on the green-car lines. Union employees of the Third Avenue System and the Second Avenue Railroad, the other surface lines in Manhattan and the Bronx that were mixed up in the preceding strike, voted on Thursday night against joining the strike at this time.

The latest figures on the lines already affected by the strike show that a total of 1150 men have gone out on the subway and elevated lines, while 9977 employees have signed the individual working agreement. The 1150 strikers are recruited from the following classes



of workers: On the elevated, four motormen, eight towermen, three switchmen, twenty-three station agents, 216 gatemen, 442 guards and one special officer; on the subway, three station agents, twenty-five gatemen, 240 guards and one escalator man. These figures total 976. The balance is made up of track hands, assistants in the car shops and other unskilled laborers.

As for the New York Railways, up to 9.30 a. m. Friday 1588 or almost half of the employees had signed the working agreements, giving increased wages for the next two years. No strikebreakers were being used on the surface lines, but the service was being steadily improved. At 7 a. m. Friday 136 green cars were in operation as compared to seventy the preceding day at the same hour, and at 9 a. m. the total was 234 as compared to 157 on the preceding day. Less than one-fourth of the 3000 strikebreakers whom the Interborough officials had ready for the strike had actually been used. The number actually called into service was between 600 and 700—mostly on the elevated roads and for unskilled positions such as gatemen and guards, inasmuch as the majority of the strikers had gone out there. A large number of former employees of the surface lines were using the opportunity to get back in its employ.

On Friday morning Mr. Shonts announced that the striking employees of the New York Railways would have until 1 p. m. Saturday to return to work without prejudice. The company, however, would reserve the right to reject the applications of any men who were known to have indulged in illegal acts during the strike. Moreover, no men taken back would be allowed to continue union affiliations.

#### STATEMENTS BY QUEENS AND THIRD AVENUE LINES

The New York & Queens County Railway, which was included in the preceding surface strike, in a notice to the public dated Sept. 5 stated that neither it nor its employees had any concern in the Interborough dispute. It said that it was carrying out in good faith the method provided for settlement of its own controversies, to which it agreed with Mayor Mitchel and Chairman Straus of the Public Service Commission on Aug. 8, and would continue to do so. It wanted the public to accept its assurance that it did not propose to have its part of the street car service of the city tied up because of any demand of a labor union that another company shall grant its demands through a committee representing a small disaffected minority of its employees.

In a similar notice to its employees, the company reminded them that it was their duty to remain in continuous and peaceable performance of work. If as a matter of sympathy with any disaffected men of the force of any other company, or as a matter of obedience to the dictation of any union, any men should leave the service of the company, their places would be filled by others. First preference would be given to present employees who remained at work. They would be entitled to an advance of seniority rights and would hold such seniority during the continuance of their employment against any employee who should have left the service and might afterward for any reason be taken back into the employ. Employees not reporting for duty or not taking out runs assigned during any emergency would be considered out of the service.

The Third Avenue Railway stated on Sept. 7 that it was endeavoring to carry out in good faith the method provided for the settlement of any of its own controversies as agreed on Aug. 7, and it expected the employees to do the same. On Sept. 6 at a conference between the management and employees further consideration of a proposed agreement was had, and each of its twenty-six sections was fully discussed. As a re-

sult a number of them were agreed to, several were passed for further discussion and others, including those relating to the increase in wages, were also considered. It was concluded to arbitrate these questions.

#### LITTLE DISORDER IN EARLY STAGES OF STRIKE

Up to Friday morning few signs of disorder were apparent along the affected lines. In some cases missiles were hurled at the elevated trains, and some employees were roughly intimidated, but in general the situation was quiet. Police Commissioner Woods ruled that pickets would not be permitted to ride on the front platforms of cars and attempt to recruit motormen. His reason for ruling against such action, Commissioner Woods said, was that the motorman's attention would be distracted and public safety endangered.

Throughout the city there were 5000 policemen on strike duty. There was one man to each of the surface cars; two to each of the elevated and subway trains being operated; two to each of the subway and elevated station platforms, and others guarding the power stations, sub-power stations, and car barns and terminals.

#### COMMISSIONER BEGINS INVESTIGATION

On Thursday Chairman Straus of the Public Service Commission subpoenaed Mr. Shonts and Mr. Hedley, representing the railways, and W. B. Fitzgerald, organizer, and William Conway, local president, for the men. Hearings were held throughout the day in an effort to learn the issues involved in the strike and to fix the responsibility for the downfall of the New York Railways settlement underwritten by Chairman Straus on Aug. 7.

At this hearing Mr. Fitzgerald was asked why the strike on the New York Railways took place without any formal request for arbitration. He replied that he and his associates had offered to arbitrate the fairness or unfairness of the contracts on the Interborough system, but this had been declined by the company, and the fact that similar contracts had been prepared for the employees of the New York Railways Company caused the union to abandon its promise to arbitrate. The union had no signed agreement with the Interborough Company, but from previous interviews with Mr. Hedley the men understood that the same policy in regard to treating with the union which had been followed by the New York Railways would be followed also by the Interborough Company. Several statements by Mr. Hedley, taken from the stenographers' minutes of the meetings, were then read into the minutes. The gist of them was that in Mr. Hedley's opinion unless the directors who had molded the policy for the New York Railways Company were to reverse themselves, the Interborough would have to deal with the union.

Mr. Hedley, in his testimony, said that the Interborough had no signed agreement with the union as was the case with the New York Railways. Personally, he had not been in favor of the agreement of Aug. 7 made by the New York Railways. He believed the road could deal with its own employees more effectively than through "outside parties."

Mr. Shonts testified that the directors of the New York Railways on Sept. 6 had voted not to ask their employees to sign individual service contracts. This action was taken about two hours before Mr. Hedley and the union leaders had the conference that resulted in the strike. Asked why Mr. Hedley had not told the union leaders that the company did not intend to send out the service contracts, Mr. Shonts said Mr. Hedley had not heard when he went into the conference that the directors had taken this action, and did not learn of the decision until the next day, after the strike had begun and the working agreements were circulated.



## Evils of Union Domination

### Views of a Prominent Manager on the Activities of the Electric Railway Labor Agitators

THE steam railroad labor crisis has brought the methods by which steam railroad employees enforce their demands prominently before the attention of people of this country. The question of union domination, however, is not confined to the steam railroads. Many electric railway companies have also had experience with it, and the seriousness of the situation is increasing rather than decreasing. During the past week the editors of this paper have had the opportunity of obtaining an expression of opinion from the manager of an important electric railway property on this general condition. The following is an abstract of his remarks:

#### HOW THE AMALGAMATED ASSOCIATION OPERATES

"From my point of view many serious and vital problems confront the American Electric Railway Association, as representing the street and interurban railway properties throughout the country, but all of these problems pale into utter insignificance as compared to that of having their properties organized by the Amalgamated Association and dominated by that organization.

"The present plan seems to be for the Amalgamated Association to pick out properties individually, where from peculiar municipal conditions or a favorable feeling of the Mayor or public officials to the Amalgamated Association, organization is rendered possible and then use the whole resources of the Amalgamated Association, including all of its financial resources, to organize this property. On the part of the street railway companies, each company is permitted to fight out its own battles alone and unaided, except solely from the moral support and sympathy of the other properties, but this is not of any great material assistance to a struggling street railway property which is unable to bear the financial burden imposed upon it by loss in receipts and heavy expense in operation caused by strike conditions.

#### RAILWAYS MUST GET TOGETHER

"Unless the street railway companies of the country realize the situation that they are facing and get together an organization for combating the tactics and methods followed by the Amalgamated Association and present a united front to the organization of their properties by the Amalgamated Association, I can personally see nothing but disaster ahead for a vast number of the weaker street railway properties throughout the country. The trustee of the mortgages of these properties and the financial interests connected with them usually require that a fund is to be set aside covering losses to the property that may accrue due to fire or tornado, but they make no provision against losses occurring through attacks of the Amalgamated Association, both in loss of receipts and destruction of property, which are vastly more serious at the time of a strike occurring and in their after effects than any losses due to fire or tornado or flood could possibly be.

"In my judgment, if a number of street railway properties in the country would get together and form a nucleus to start with and set aside a percentage of their gross receipts, say, running from 1 to 3 per cent, for a strike fund which would be handled by a committee to be selected, for example, by the American Electric Railway Association, covering funds to be expended for the defense and protection of the properties attacked by the Amalgamated Association, this would be of greater benefit to the street railway and interurban interests of the country than the solution of any other problem now confronting them, and unless the street railways inter-

ests of the country wake up to the true conditions of affairs and some plan of this kind is worked out by the American Electric Railway Association, or the larger financial interests of the country who have their money invested in street railway properties, I can see nothing but disaster ahead for them.

#### SITUATION ON THE BOSTON ELEVATED

"Take the Boston Elevated property to-day, as an example. If you will look over their last wage agreement you will find that in addition to covering the motormen and conductors, it includes between fifty-five and sixty departments of the company, exclusive as I have just stated of motormen and conductors, reaching even to 'stockroom clerks,' 'treasury department employees,' etc. In case of the disciplining or discharge of a man, or a number of men in any of these departments, regardless of what the nature of their offenses may be, if these men are sufficiently close to the Amalgamated Association and of enough importance to them, the union has simply to say that unless the men are reinstated and given whatever their demands may be, that the whole organization will be pulled out on a strike. This would place the railway company in a position where it could not operate its power stations, or substations, etc., and would leave it utterly helpless even to make any start toward the operation of its property. It is tied hand and foot by the Amalgamated Association, and the street railway property is run only through the sufferance of the Amalgamated Association and practically as it may dictate. I simply refer to the Boston Elevated as I happen to have just read a copy of their last articles of agreement, but there are any number of companies throughout the country which are in exactly the same condition as the Boston Elevated.

#### AN EFFECTIVE DEFENSE PLAN IS NEEDED

"It would seem from the recent developments in New York City, with the surface, the elevated and the subway lines, that the true character of the Amalgamated Association should be made plain to the street railway interests throughout the country and that this absolutely vital question should arouse sufficient interest among them to wake them up to a plan of defense which would effectually and forever put down the tyranny and oppression now exercised over any property which may have been forced into membership in the Amalgamated Association by methods of strike, rioting, bloodshed and destruction of property, and would cause the street railway companies throughout the country to join together and present a united front against the further wrecking and devastating of street railway properties by an outlaw organization such as the Amalgamated Association.

"When the Amalgamated Association goes into a city to organize the same, it is usually able to get together at least a small nucleus of discontented employees, sufficient to call a strike and make a disturbance. The Amalgamated Association then demands arbitration of its differences to prevent a tie-up of street railway traffic. This appeal usually strikes the uninformed public and newspapers as only fair. An arbitration agreement is then entered into, and this gives the Amalgamated the foothold among the employees of the company that it wants, and then, after getting the property fully organized, unless the Amalgamated gets what it wants, its slogan is 'arbitration be damned.'

"This policy of the unions is perhaps most forcibly evidenced by the attitude of the Brotherhoods in the recently threatened steam railroad strike. They were perfectly willing to arbitrate, but only after they had been granted the only real demand that they expected to gain."







car or five-car train taking power, the voltage sometimes dropped to one-half its normal value.

The releasing of this heavy load produced a voltage kick which was anywhere from one and a quarter times to twice normal voltage. If the compressors were running at the time they invariably flashed over, blowing the fuses.

In order to overcome this difficulty various plans were tried, such as the use of choke and resistance coils in series with the compressor motor circuit, but these afforded very little satisfaction. It was finally decided to build a relay that would operate at 725 volts and, on application of this potential, open the 14-volt magnet circuit which held the compressor pneumatic switch closed. Several of these were built and operated very well.

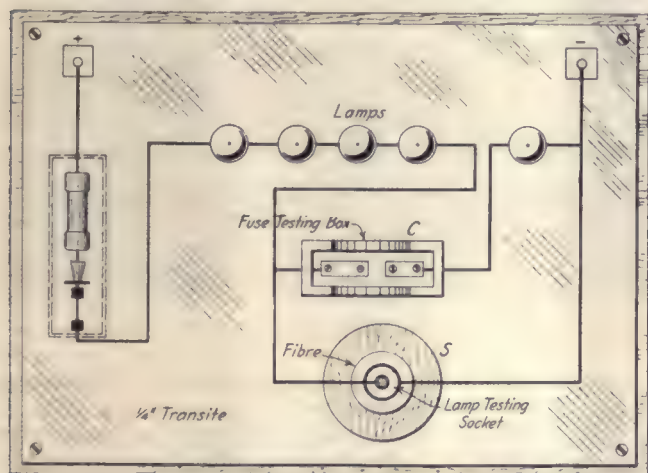
After one year's trial 100 more were installed, and after two years' service these have cut the consumption of fuses on the cars about 60 per cent. The wiring diagram on page 454 shows how the relays were connected in the circuit.

## Combination Fuse and Lamp Test Board

Time Is Saved by Using This Testing Outfit in the Maintenance Storerooms

BY E. D. RANSOM, B.E.

Considerable time is wasted in maintenance work in separating good fuses and lamps from those which are burned out or otherwise defective. Many times a man will traverse a considerable distance between a store-room and a car only to find that the lamp or fuse he has secured to replace the defective one is also defective. Where locking receptacles are used the time wasted in installing a defective lamp is still greater. To eliminate this waste of time the test board shown in the accompanying illustration has been installed near the door of each maintenance shop stockroom of a well-



COMBINATION FUSE AND LAMP TESTING BOARD

known railway system. All lamps and fuses can now be simply touched to the proper contacts as they are being taken out of the stockroom, thus making certain that the fuse or lamp is a good one.

The test board consists of five lamps, a fuse test box, C, and a stripped socket, S for the lamp test. If a fuse is placed across contacts in the test box the lamps which form a standard five-light circuit will light if the fuse is a good one. The lamp to be tested is pushed in the stripped socket S and the lamps in this circuit will light if the lamp being tested is not defective.

The sides of the fuse test box are of maple, the wood being cut away to form arched gaps which permit a man's hand to go far enough into the box so that the fuse which he is holding can be touched to the copper contact blocks in the bottom. These contact blocks consist of two sections of scrap bar copper about 1 in. x 1/4 in. in cross-section, laid in the bottom of the box, and flush with the surface. The bottom is made of transite, and the contact blocks are held in place by screws which do not go through the transite into the wood below. The gap between the contact blocks is arranged so that the smallest fuse will just bridge the gap while the over-all length of the contacts from end to end is arranged to take the largest fuse used.

The lamp test socket is made of an ordinary socket, the threads being pounded out leaving the sides smooth and slightly larger in diameter than the original threads.

In this way a lamp has merely to be pushed in to make contact. Lamps can be tested in this socket as fast as a man can pick them up and put them down again. Around the socket there is a large wooden rosette with a ring of fibre between it and the metal part of the socket. As this rosette extends beyond the top of the socket, it protects the workman against accidental contact.

The board proper on which the testing apparatus is mounted consists of a wooden base entirely covered with 1/4-in. transite and equipped with a standard control switch and fuse protected by a box with a door.

In addition to trying out lamps and fuses for immediate use, all lamps received at the shops of this company are tested when delivered, as they can be tested as fast as they are unpacked. The test boards have proved to be very convenient and the time saved makes them well worth the small cost of construction and installation.

## Long-Lived Poles

Some interesting facts on the life of poles have recently been obtained by the Lindsley Brothers Company, Minneapolis, Minn., dealers in Western and Northern cedar poles. The fact that this company was established in 1896 and began shipping Western red cedar poles into the Central States in 1899 affords it unequaled opportunity for making a study of this kind.

Some months ago the company wrote to a number of concerns to which it had furnished red cedar poles in these early days asking about their present condition. A company in St. Paul, Minn., reported that of a lot of poles set in 1899, 90 per cent are still in very good condition and should last at least five years longer before reinforcement is necessary. Another company in Fort Worth, Tex., reported that of the lot set in 1899 none had been removed on account of rotting. A company in Milwaukee made the same statement, and one in Louisville reported that of sixty poles set in 1901-1902 only two had been replaced and the others seemed good for ten years. Reports of very similar tenor, with the year in which the poles were set, were received from Minneapolis, 1900; Dallas, Tex., 1899; Menominee, Mich., 1899; Iron Mountain, Mich., 1899.

In addition to these investigations, which were conducted by mail, a special study was made by G. L. Lindsley, of the firm, of some poles shipped to Grand Rapids, Mich., in 1900. These poles were still standing, apparently in as good condition as when first set. On closer investigation, a little sap rot was found just below the ground line but not enough to weaken the pole in any way. Other red cedar poles which were set in 1900 in Detroit were also found by Mr. Lindsley to still be in good condition.



## Rail Wear and Corrugation

English Rail Expert Discusses the Curved Head Rail and Commends a New Process Steel for Tramway Rails

In the issue of the *Railway and Tramway World*, London, England, for Aug. 10, 1916, considerable space is devoted to a discussion of rail design, and rail wear and corrugation, based partly upon articles which have appeared in recent issues of the *ELECTRIC RAILWAY JOURNAL*. In one of the leading articles Robert B. Holt,



CROSS SECTIONS OF LEEDS 1910 CURVED HEAD RAIL AND WORN TIRE SHOWING INTIMATE CONTACT OF TREADS

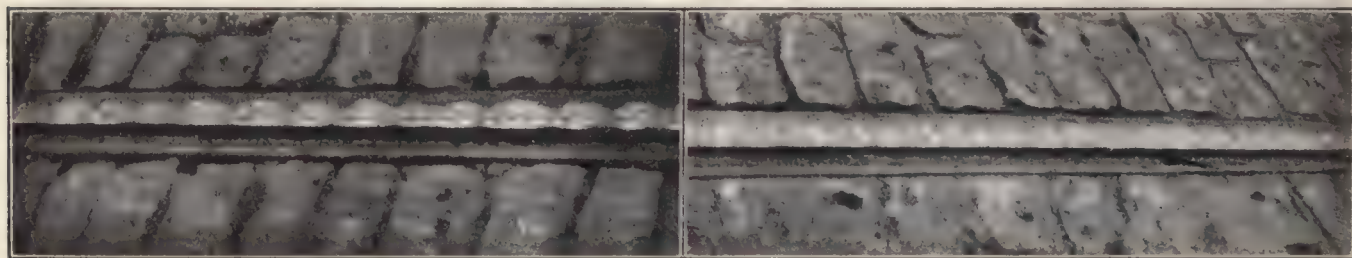
highways and permanent way engineer, Leeds, summarizes the progress which has been made in the last five years as exemplified particularly in the city of Leeds.

In articles published in the *Railway and Tramway World* in 1910, Mr. Holt had called attention to the inequalities in wear of rails and wheels due to defects in the design of both. He had noted that in service rails assume a convexity of about 12 in. radius, and he referred in these articles to the imperfect contact which existed between new rails with flat or inclined plane treads and worn wheels, and between partly worn rails and new tires. As a result of the poor contact there

imperfect contact causes detrusion of rail-head metal. However, the experience in Leeds has shown that Mr. Cram's conclusions as to corrugation do not hold, because in Leeds there has been no diminution in the tendency for rails to corrugate.

Quoting from an interim report of the Municipal Tramways Association committee on rail corrugation, he states that the investigations of this committee "show that the occurrence of corrugation is independent of the number of cars which have passed over the rails"; that "corrugation produced by one set of cars may be entirely removed by another set of cars running in place of the first, and may also be caused and removed by the same set of cars under apparently the same conditions"; that "corrugation appears on the rails independently of whether the wheels are being actively driven by the motors or not. The committee is of the opinion that the explanation of this may be the slip and skid taking place owing to the different diameters of the wheels, which difference largely results from the unequal wear produced by the relative difference in the speeds of the motors." The committee further states that "it considers that it has ample evidence that the force or forces responsible for the reaction which results in rail corrugation are external to the rail. It is realized, however, that while rails rolled to any known specification are affected to a certain degree by this reaction, some are not affected to the same extent as others. From evidence collected, coupled with experience of the members of the committee, it is of the opinion that steel for rails can be obtained which is more durable and less liable to the development of corrugation than the ordinary varieties of steel in use at present."

Mr. Holt next takes up an article by G. E. Pelissier appearing in the issue of the *ELECTRIC RAILWAY JOURNAL* for Sept. 30, 1911, page 528. He commends this article, but directs attention to Mr. Pelissier's contention that most corrugation can be eliminated by so designing the rail head, wheel tread and wheel flange, and by so laying the rails that the maximum intensity of pressure occurs near the center of the rail tread, and as far as possible from the gage line fillet. He also



CORRUGATION DEVELOPED ON LEEDS RAIL AFTER PASSAGE OF 523,350 CARS AND 300,000 CARS RESPECTIVELY

was detrusion of the metal in the rail head. To overcome the defects mentioned, Mr. Holt had designed a rail with a curved head of 12-in. radius which was put into operation in Leeds in 1910. This is shown in cross-section in an accompanying illustration, which shows a worn tire in contact with a new rail. The operation of this rail has been satisfactory. Although Mr. Holt favored a curved wheel tread contour no alteration had been made in the contour of the wheels in Leeds.

In the present article Mr. Holt states that many other British tramways have adopted convex rail heads, and that the British engineering standards committee is said to be contemplating alterations to its rail sections in this direction. He then quotes at length from an article by R. C. Cram appearing in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 25, 1915, page 1246. He agrees with Mr. Cram in concluding that

quotes Mr. Pelissier's recommendation that the elastic limit of the steel should be raised and the area of contact between rail and wheel increased. Although the Leeds rail and that designed by Mr. Cram fulfill Mr. Pelissier's requirements regarding contact, yet in the Leeds rail corrugation still occurs. Mr. Holt's conclusion is that attention to the composition and method of manufacturing steel offers the only practical way of dealing with corrugation.

On the Leeds tramway during the past eight years Sandberg silicon steel rails have been used. Although immunity from corrugation has not been entirely secured, only a relatively slight amount of grinding has been necessary. During the past year, air-cooled steel of the same composition has been experimented with in Leeds. This cooling is a patented process which can be applied to any rail, and it is said to increase the life



from 100 to 150 per cent. Tests made at Leeds showed about 6 per cent more tensile strength and 13 per cent less elongation for the new as compared with the ordinary Sandberg rail. So far no corrugation has developed with the new rails and superior wearing qualities have been shown.

In the same issue of the *Tramway and Railway World*, and on the same general subject, is a comment upon the results secured with differential gear drive on the Huddersfield Corporation Tramways, the details of which were described in the issue of the *ELECTRIC RAILWAY JOURNAL* for July 3, 1915, page 26. By this plan the wheels are driven independently, so that there is no slippage on curves. This type of drive has been in use since October, 1914, and although there has been no reduction in tire wear or current consumption, rail corrugation has been eliminated.

### Armature Buggy Constructed at Small Expense

A simple armature buggy has been designed and put in operation by E. G. Daniels, master mechanic Macon Railway & Light Company, Macon, Ga. The accompanying illustrations show the construction and operation of this device.

In using the buggy, the workman rolls it to the armature and lowers the carriage by raising the long handle. The eye-bar is slipped over one end of the armature shaft and the other end of the shaft is hooked to the carriage as shown. The carriage is then raised by lowering the handle, and when the latter is hooked in position the outfit is ready to be rolled to any part of the shop.

The buggy is of rugged construction and the cost to the company was small, as the wheels were the only



ARMATURE BUGGY USED IN THE SHOPS OF THE MACON, GEORGIA, RAILWAY & LIGHT COMPANY

parts that had to be purchased. A device of this kind is not only serviceable for handling armatures but may be used in handling many heavy pieces of equipment which can readily be attached to the carriage. The notches on the carriage make it possible to handle armatures of different lengths.

Improved lighting, a reduction in lamp breakages and thefts, as well as in the amount of energy consumed, and a saving of 175 ft. of wire, were the results obtained by modernizing the lighting systems of the single-truck cars used on the lines of the Public Utilities Company, Evansville, Ind. Two lines of wire in the new plan were substituted for seven lines in the original lighting circuits. In the new scheme seven 56-watt lamps light the car body and vestibules, one lamp is in the headlight and the two other lamps are in the illuminated signs.

### Finding Pole and Wire Loads

Handbooks on electric railway engineering supply many data and formulas for pole and wire load calculations, but most of the methods recommended for exact determinations include mathematical steps too far advanced for ready use by those whose engineering training has largely been obtained in the "school of hard knocks." In planning their work few line foremen resort to mathematical calculations which include algebra and trigonometry. A rule-of-thumb backed up by practical experience serves their purpose.

For those who frequently have to determine how poles should be loaded and guyed, and how wires and cables should be stressed, some very simple ways of figuring are set forth in a new booklet just issued by the Bates Expanded Steel Truss Company, Chicago, Ill. The methods give the results of the experience of A. S. Bates.

Mr. Bates gives a number of tables from which ordinary line problems can be solved readily. By means of problems he illustrates the use of the tables. He also gives a number of illustrations to show how the results

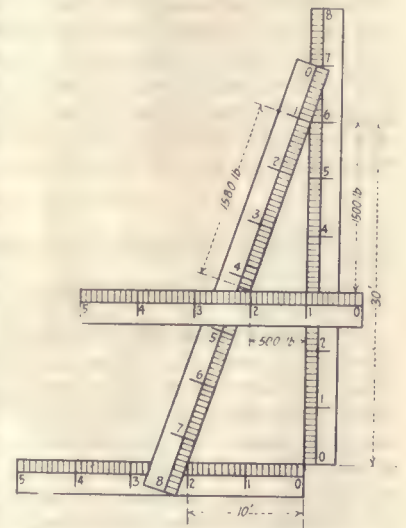


DIAGRAM SHOWING USE OF SCALES IN LINE CALCULATIONS

of calculations based on the tables can be checked or the problems solved graphically by means of scales. The use of these can best be explained by an example.

In the accompanying figure are shown four scales arranged for a guy-wire problem. Assume that a horizontal pull of 500 lb. on a pole applied at a point 30 ft. above the ground is to be counteracted by means of a guy attached at the same point and entering the ground 10 ft. from the base of the pole. The problem is to determine the pull in the guy wire and from this the safe size of wire. Incidentally the vertical compression on the pole produced by the guy wire will be of interest.

For convenience the scales should be divided into inches and tenths of inches. Two of them are placed at right angles as shown for the purpose first of determining the angle of the guy. Five feet to the inch is selected as a convenient scale of length. A third scale is laid diagonally across the first two from point 6 (rep-



representing 30 ft. height) on the vertical scale to point 2 (representing 10 ft. on the ground) on the horizontal scale.

Remembering now that the forces involved act along directions parallel to the three scales, the next step is to choose a scale for the forces. A scale of 500 lb. to the inch is convenient. A fourth scale is then laid across the vertical and inclined scales, in a horizontal direction, and is moved upward until they intercept on it just 1 in., which represents the horizontal pull on the pole. This completes a triangle of which the other sides, to scale, represent respectively the pull in the guy wire and the vertical force in the pole. From a table of wire strengths the proper size of guy wire can be selected.

## Hot-Water Heater for Steel Interurban Cars

Coincident with the increase in the number of steel interurban cars has been the demand for a hot-water heater which would heat them comfortably when they were operating at high speeds during extremely low temperatures. To supply this demand the Peter Smith Heater Company, Detroit, Mich., has just put on the market a new hot-water heater quite similar to its No. 1-C type heater, which has been in successful operation on interurban cars for a number of years. Although the new heater has greater heating capacity

are made up of  $1\frac{1}{4}$ -in. pipe. The magazine feed chamber passes down through the center of the upper coils, and it is of sufficient capacity to supply coal for a twelve-hour run. It will also be noted that the heater coils are interconnected on the outside of the heater casing, and that a  $1\frac{1}{2}$ -in. air space is provided between the inner and outer casings to insulate the heater so that it may be installed close to the interior wood finish of a car.

In connection with the hot-water heater installation it has been found preferable to provide a double circulation system with a set of heater coils on each side of the car body. This reduces the hot water travel one-half in making a complete circuit of the heating-pipe system, and thus insures a more uniform temperature throughout the car body. Piping systems of this kind are just as readily arranged for center-entrance cars as for end-entrance cars. The heater may be installed at any convenient point in the car, and a piping system provided which will offer free water circulation, and, therefore, uniform heat distribution.

## Concreting in Cold Weather

The Portland Cement Association has formulated the precautions necessary to insure best success with concrete work in cold weather, with the statement that while there are limitations to the practicability of doing concrete work in winter it can be done successfully by

following a few simple rules. Some of the suggestions are in substance as follows:

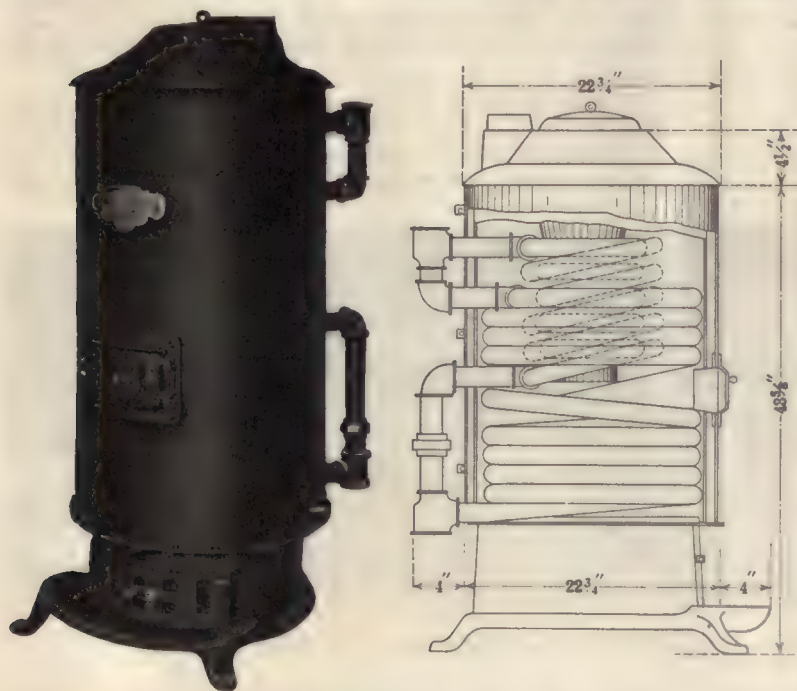
During the first few days following the placing of concrete, alternate freezing and thawing at comparatively short intervals will damage it; therefore, it is necessary so to mix, place and protect the concrete that early hardening will be complete before the work is exposed to freezing temperatures.

Sand and pebbles or broken stone used must be free from frost or lumps of frozen material. If these materials contain frost or frozen lumps they should be thawed out before using. As cement forms but a relatively small bulk of the materials in any batch of concrete, it need not be heated, but mixing water should always be heated.

Although adding common salt to mixing water will prevent freezing of concrete that has not hardened, there is a limit to the quantity of salt which may be added if the final strength of the concrete is not to be affected. Salt simply lowers the freezing point of the mixing water; it does not supply what is most needed—heat and warmth. It delays, rather than hastens, the hardening of the concrete.

Sand and pebbles or broken stone and mixing water must be heated so that the concrete when placed shall have a temperature of from 75 to 80 deg. Fahr. Some sands, pebbles and varieties of broken stone are injured by too much heat. A temperature not exceeding 150 deg. will generally prove most satisfactory.

Concrete should be placed immediately after mixing so that none of the heat will be lost before placing in the forms. Metal forms and reinforcing should be warmed before the concrete is placed. Forms can be warmed by turning a jet of steam against them or by wetting with hot water. The concrete should be protected immediately after placing. Canvas covering, sheathing, housing in the work, or hay or straw properly applied will furnish the required protection for some work. In ad-



VIEW OF HEATER AND CROSS SECTION SHOWING COIL ARRANGEMENT

than the 1-C type, this has been obtained without requiring much additional floor space. The new hot-water heater occupies a space  $22\frac{3}{4}$  in. in diameter, which is  $2\frac{3}{4}$  in. larger than that required for the 1-C type heater, and the height of the two heaters is the same. This new type hot-water heater for steel interurbans is shown in the accompanying illustrations.

Two features in the design of the new hot-water heater are to be found in the arrangement of the hot-water coils and the manner of connecting them in the heating system. Two sets of coils are mounted in the heater drum, the lower one of which is made of  $1\frac{1}{2}$ -in. pipe and it serves as a fire pot, and the upper coils lie directly over the fire. The outer portion of this upper coil is made up of  $1\frac{1}{2}$ -in. pipe, and the two inner coils

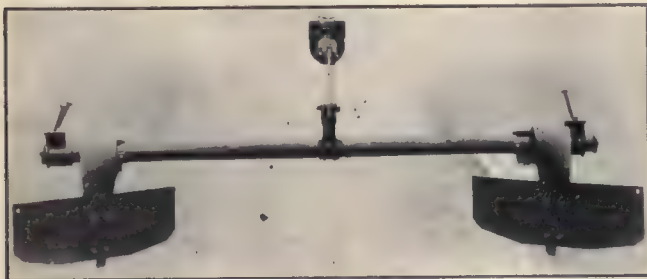


dition to those means, small oil or coke-burning stoves or salamanders may be used in inclosed structures. In severe, cold weather protection should be continued for at least five days. Temperatures which may not be low enough to freeze the concrete may, nevertheless, delay its hardening for a considerable time.

Frozen concrete sometimes very closely resembles concrete that has thoroughly hardened. When frozen concrete is struck with a hammer, it will often ring like properly hardened concrete. To determine whether concrete has hardened or is simply frozen one board may be removed from some section of a form, and hot water poured on the concrete, or the flame of a plumber's blow torch or a jet of steam under pressure may be turned against the concrete. If the concrete is frozen the heat will soften it by thawing the water contained in it. Although concrete which freezes before early hardening has been completed may not be permanently injured if after thawing out it is not again exposed to freezing until hardened, nevertheless protecting the concrete against the possibility of freezing is best.

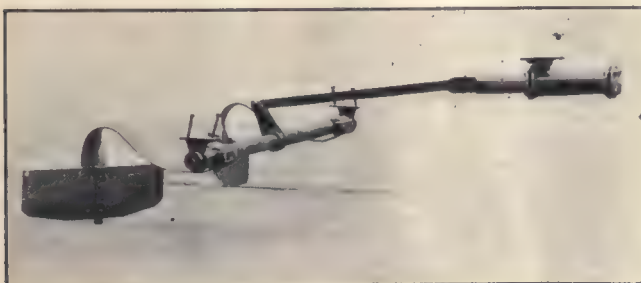
### An Improved Snow Scraper

The Root Spring Scraper Company, Kalamazoo, Mich., has placed on the market a new snow scraper for use on low-level or other city cars. This scraper, which is shown in the illustrations herewith, consists of a shaft, an operating arm, and a spring scraper attachment for each rail. The design is such that the shaft



FRONT VIEW OF SCRAPER SHOWING ADJUSTABLE BLADE RESTING IN RAIL FLANGES

is as low as 10 in. to 12 in. from the top of the rail and can be attached to the car sills or platform arm directly or by means of brackets. The operating arm on the shaft is adjustable, so that it can be set to give any desired tension to the scraper flanges on the rail. Only one-half turn of the wheel, which is located in the cab



SIDE VIEW OF IMPROVED SCRAPER SHOWING OPERATING MECHANISM

of the car and attached to the operating arm, is necessary to lock the scraper to the rail with any pressure desired. The springs, which are attached to the scraper flanges, are so shaped that they will yield when going forward and will not turn under when the car is going backward. The blades of the scraper, which set into the flange of the rail, are adjustable and can be dropped

or lowered as they gradually wear down. This scraper has a concentric locking device which automatically locks the blades of the scraper to the rail or in a carrying position. It can be operated by air, by wheel and staff, or by lever hand power.

### A New Lock Nut

The Industrial Development Corporation, Chicago, Ill., is placing upon the market a form of spring lock nut which is said to have been proved effective by long continued tests. It consists of a punching of spring steel bent double, as shown in the accompanying illustrations, and tempered. The punching is so shaped



NEW TYPE OF SPRING LOCK NUT

that when bent to finished form the outline is that of a standard nut. Holes of diameter slightly larger than the bolt are punched to be somewhat offset when the lock nut is bent to form. When the lock nut is drawn into close contact with the main nut it binds in the bolt threads, but friction between the two nuts causes it to follow the main nut on the thread.

### A Pipe Bender Made of Trolley Wheels

Three old trolley wheels mounted on lag screws driven into an 8-in. x 8-in. wooden building column serve as the device for bending fender rods and pipe in the shops of the Galesburg (Ill.) Railway Lighting & Power



PIPE-BENDING DEVICE

Company. The arrangement of these wheels is shown in the accompanying illustration. The picture also shows a pipe vise mounted on the same building column, where it is convenient for pipe work, which is practically all done at this point in the shop.



## NEWS OF ELECTRIC RAILWAYS

### RESETTLEMENT PROPOSED IN OAKLAND

#### Chamber of Commerce Submits Charter Amendment to Aid Railway—Is Seeking Election by Initiative

The Chamber of Commerce, Oakland, Cal., as the result of an appeal by the San Francisco-Oakland Terminal Railways for help in solving its financial and operating difficulties, has drafted a charter amendment to be submitted, if possible, to the people for ratification at the coming November election. The City Council has failed to pass a resolution to place the amendment on the ballot, but an attempt is being made to do this by means of an initiative petition. Various items regarding the proposed reorganization of the San Francisco-Oakland Terminal Railways have previously been reported in these columns.

The proposed charter amendment provides for a resettlement franchise similar to the Kansas City and Chicago plans, but with alleged improvements. In brief, it provides for an appointment by the Mayor of an advisory board with seven members to co-operate with the City Council in drafting the franchise ordinance. This would be submitted to the people for ratification at the spring election in 1917. The franchise would be for an indeterminate period on condition that the city might buy out the system on six months' notice and might transfer its right to buy to a third person, firm or corporation.

The conduct of the traction affairs would be carried on by a joint board, one member representing the city and one the company, with an arbitrator to be called in if necessary. The net profits would be divided between the city and the company, the city to get not less than 55 per cent and the company to be allowed 6 per cent on its valuation and a proper amount for maintenance, operation, taxes, insurance and depreciation.

In the event of purchase by the city, the price would be the valuation of the property as fixed by the State Railroad Commission at the time of granting the franchise, plus the cost of all additions, extensions and betterments as authorized by the board of control and minus depreciation as fixed by the same board and also minus properties sold and abandoned. The city might assume the outstanding obligations of the company, subject to the State constitution, up to the valuation fixed by the State Railroad Commission, the bonds then to be secured by the city's credit or by a lien on a fixed percentage of the gross earnings.

The charter amendment, as first outlined, was intended to apply only to the affairs of the traction company, but as the special committee of eleven appointed by the Chamber of Commerce to unravel the tangle got further into its investigations, it was decided to broaden the amendment so as to permit any public utility to seek a resettlement franchise.

In addition to the principal provisions of the plan as outlined above the charter amendment provides that resettlement franchises shall be let to the highest bidder, 55 per cent of the net annual profits to be the minimum bid, and bids to be raised not less than one-half of 1 per cent. It is also provided that no other street railway or steam railroad shall use the tracks of the franchise grantee, except on express permission of the city.

In the final draft of the amendment the committee had the assistance of George K. Weeks, president San Francisco-Oakland Terminal Railways; W. I. Brobeck, its attorney, and C. A. Beardsley, counsel for the stock and bond holders. Mr. Weeks is reported to have said, after the amendment was whipped into shape for submission to the popular vote, that he considered the plan the best yet evolved in the United States for straightening out street-car difficulties.

Work was started, on Aug. 15, under the direction of the special committee of the Chamber of Commerce, to place the proposition upon the ballot for November. It was planned to obtain 15,000 names as soon as possible to file

with the city authorities, asking the election. The names must be filed not later than Sept. 7. The decision of the committee to force the issue followed the refusal of the City Council to take up the plan.

### NORFOLK FRANCHISE NEGOTIATIONS FAIL

The proposed new franchises to the Virginia Railway & Power Company in Norfolk have not been acted upon. The old City Council went out of existence Aug. 31. On Sept. 1 the company published in the daily papers a notice in regard to the withdrawal of tickets from the lines of the Norfolk Railway & Light Company. This was followed the next day with a statement of the reasons for the withdrawal. The contract referred to is a ten-year contract with the city covering gas and electric rates and the sale of tickets at stations. It expired on April 1, 1916.

The City Gas Company has filed new gas rates with the State Corporation Commission. The price runs from \$1.10 down to 80 cents, with a discount of 10 cents per thousand, with additional discounts of 10 cents and 5 cents per thousand to very large consumers. The special committee appointed to make a report on gas rates failed to present its report before the old Council went out.

The advertisement which appeared in the papers on Sept. 1 is as follows:

"The contract between the Norfolk Railway & Light Company and the city of Norfolk, providing for the sale of tickets at certain stations in the city at a price of six tickets for 25 cents, good on cars of said company, having expired by limitation, the street car fares authorized by the franchise contracts under which the lines of said company are operated will be restored and the sale of such tickets at said stations will be discontinued after Sept. 10.

"No tickets sold after Sept. 10, 1916, except school tickets as hereinafter stated, will be accepted on the cars operated on the lines of the Norfolk Railway & Light Company except in that portion of the city of Norfolk which was formerly the town of Berkley wherein the franchise ordinances require the sale of tickets.

"While not required by the franchise, the company will continue until further notice the sale of school tickets under the same regulations as have heretofore existed.

"All unused tickets will be redeemed on presentation at the company's office in Plume Street in the city of Norfolk.

"As a result of this change there will be a straight 5-cent fare on all lines operated by the Virginia Railway & Power Company in Norfolk, except the line known as the Bay Shore line; the lines in Berkley, and the line between Norfolk and Berkley."

The statement of Sept. 2 by the company to the public was concluded as follows:

"The contract with the city providing for the sale of tickets at certain stations having expired, the company is now remanded to the terms of its original franchise ordinances prescribing its rights and obligations in operating upon the streets of the city, and since these ordinances authorize a charge of 5 cents per passenger and do not require the sale of tickets, the sale of such tickets will be discontinued from and after Sept. 10, and no tickets will be sold for use on the cars of the Norfolk Railway & Light Company other than the lines in what was formerly the town of Berkley, after that date.

"It is believed the public will realize the reasonableness of this action on the part of the company. Not only is the fare of 5 cents a reasonable, and in fact a low fare, as it has recently been declared to be by the Council in fixing the fare on the jitney bus, but as the company is required to live up strictly to the provisions of its contract in favor of the city and to discharge fully its obligations thereunder, it is reasonable that it should expect the benefits of such contract upon the faith of which the investment in the properties was made and the obligations of these contracts assumed."



## ELECTRIC RAILWAYS EXEMPTED

The act of Congress fixing the workday of railroad employees after Jan. 1, 1917, at eight hours specifically excludes the electric railways from its provisions. Section 1 of the act, which contains this exemption, is as follows:

"Sec. 1.—Beginning Jan. 1, 1917, eight hours shall, in contracts for labor and service, be deemed a day's work, and the measure or standard of a day's work for the purpose of reckoning the compensation of all employees who are now or may hereafter be employed by any common carrier by railroad, except railroads independently owned and operated, not exceeding 100 miles in length, electric street railroads, and electric interurban railroads, which are subject to the provisions of the act of Feb. 4, 1887, entitled 'An Act to Regulate Commerce,' as amended, and who are now or may hereafter be actually engaged in any capacity in the operation of trains used for the transportation of persons or property on railroads, except railroads independently owned or operated, not exceeding 100 miles in length, electric street railway, and electric interurban railroads from any State or Territory in the United States or the District of Columbia, to any other State or Territory of the United States or the District of Columbia, or from one place in a Territory to another place in the same Territory, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States.

"Provided, That the above exceptions shall not apply to railroads though less than 100 miles in length whose principal business is leasing or furnishing terminal or transfer facilities to other railroads, or are themselves engaged in transfers of freight between railroads or between railroads and industrial plants."

## PENNSYLVANIA JITNEYS MUST GET SERVICE PERMIT

The Public Service Commission of Pennsylvania, in opinions rendered on Sept. 6, held that Bryan Blythe and W. T. Alter, operating jitneys in the vicinity of Natrona, Allegheny County, must obtain certificates of public convenience from the commission. The decisions in the main follow the lines of those handed down in the Scranton cases decided by Judge Mongahan, Philadelphia, when a commissioner. The Allegheny Valley Street Railway was the complainant. In the case of Blythe, however, it is pointed out that he had made an application for a certificate and that when a hearing was held on a protest filed by the street railway he did not appear. The opinion says:

"The granting of certificates of public convenience authorizing individuals to engage in the business of a common carrier of passengers is of grave moment to the public. Not only the public's convenience, but their safety is involved. It seems proper that the commission should be informed of the character and fitness of such applicants and also as to their ability to perform the service which such certificates of public convenience would impose upon them."

The opinion contains an order that Blythe must stop operating until he obtains a certificate. A similar order is also made in the case of Alter.

## EDITORIAL TRIBUTES TO MR. CHRISTY

The principal Akron papers said editorially of the late Will Christy, vice-president of the Northern Ohio Traction & Light Company, Akron, Ohio:

"Will Christy had not an enemy in the whole city which had been his home since boyhood, which speaks better than all else for the exemplary manner in which he had lived and for the strength of his character. He was always loyal and helpful to his friends, and when fortune favored his business endeavors the resulting wealth and influence that were his did not abate in the slightest degree the genuinely democratic nature of his impulses and associations."

"In the death of Will Christy, Akron loses a valuable citizen and the traction industry of the country one of its far-seeing leaders. Mr. Christy was a practical dreamer with the faculty of making his dreams come true. He saw Akron and his work in a big way—that was the secret of his success. He was still dreaming of big things for Akron when he was called from his busy desk. He was not content to work in his own field. He was interested in all industry,

in finance, in Akron. His aid, unostentatious and unsolicited, has gone to many industries and many philanthropies."

## JOINT ENGINEERING BOARD FORMED IN MINNESOTA

The engineers of Minnesota believe that through co-operation of various engineering societies they can be more useful to their communities, and are attempting to bring about closer co-operation through the formation of the Minnesota Joint Engineering Board. The constituent societies represented on the board are the Northwestern Association of the members of the American Society of Civil Engineers, the Minnesota Section of the American Society of Mechanical Engineers, the Minnesota Section of the American Institute of Electrical Engineers, the Minnesota Surveyors and Engineers Society, the Engineers Club of Minneapolis, and the Civil Engineers Society of St. Paul. It is hoped that through this central organization the activities of the engineers of the State may be more closely correlated and more accomplished for the public welfare. Geo. W. Rathjens of St. Paul is the secretary of the board.

## CROSTOWN RAPID TRANSIT LINE URGED FOR BROOKLYN

That a crosstown subway in Brooklyn reaching into Queens is indispensable to the proper development of those two boroughs is pointed out by Commissioner Travis H. Whitney and LeRoy T. Harkness, chief of rapid transit, of the Public Service Commission for the First District of New York, in a report to that body dealing with the third-tracking of the Fulton Street elevated line in Brooklyn and with the whole transit situation in the borough of Brooklyn. The report also recommends the institution of negotiations with the New York Municipal Railway Corporation looking toward the fixation of a price at which the existing elevated railroads in Brooklyn can be taken over by the city.

The report suggests a subway extension connecting with the Fourth Avenue line at Fulton Street and Ashland Place and extending under Fulton Street to a point near Cumberland Street, where a connection might be made with the Fulton Street elevated line. If the opportunity were made for such connection, it is pointed out, the existence of the present Fulton Street elevated tracks east of Cumberland Street will be obviated. The report also suggests that a line in Livingston Street, Brooklyn, be built with funds raised by assessment upon property benefited together with certain funds which it is proposed shall be provided by the city.

The crosstown line, it is pointed out in the report, will furnish a through route from Coney Island to Queens, uniting disjointed sections of both boroughs. It is suggested that the crosstown line be built with funds raised by assessment upon property benefited. No statement of the cost of this line, it is pointed out, can be made at this time. The report holds against the suggestion which has been made of abandoning the Nassau Street line in Manhattan immediately and turning the funds thereby released toward the construction of the crosstown line. Several other suggestions are made in the report, one being to the effect that investigation and consideration of the plans and scope of the proposed crosstown line improvement be made at once and that the preliminary steps toward laying out an area of assessment be undertaken. It is suggested that a committee of ten be named, five appointed by the New York Municipal Railway Corporation of Brooklyn and five by the Public Service Commission, to institute negotiations with the railway looking to the making of a valuation of the elevated railroads in Brooklyn. The report states that if this committee is appointed at once such rapid progress may be made that within a period of a few months it can be shown whether success or failure will attend the carrying out of the proposed plan.

The report also renews the recommendation made in a previous report by Commissioner Whitney and Mr. Harkness in which they disapproved a plan for the transfer of the elevated tracks from lower Fulton Street, Brooklyn, to Adams Street. The report points out that this project would cost a very large sum of money and would be hardly worth the expenditure.



### A PLEA FOR THE TROLLEY

Further evidence of increasing newspaper appreciation of electric-railway problems is shown in an editorial in the Wareham (Mass.) *Courier*. That paper recently said in part:

"These are hard times for the rural trolley companies. They are having difficulties in meeting the advanced expense of operation in face of the decreased revenue from travel. Trolley stocks are not attractive investments these days. For the situation that exists there is a reasonable explanation.

"There are companies which were wrecked from within, but there are other companies, honestly built, honestly financed and honestly operated, which are feeling the strain from an entirely different cause. They have seen the price of equipment doubled within the last few years. They have been forced to pay more for operating expenses, owing to the increased cost of living. They have seen their taxes increase enormously, and have had to meet the most exacting demands of the various commissions which regulate their operation. Regulation, while intended to safeguard the rights of the public, has gone to an extreme, and there is danger of their being regulated to death. They are forced to incur additional expense to meet the requirements of the numerous commissions which demand different systems of accounting to meet their varying whims. They are forced to maintain safety devices which, while they may be good, cost money.

"With all this, the reports of nearly all suburban roads show that their patronage is decreasing steadily. Every automobile that is put into service means fewer passengers for the trolley roads. From this source alone the decrease has been enormous. jitneys, too, enter somewhat into the situation. Take it all in all, who would own stock in a trolley road?

"Yet trolley roads are a public necessity. They must continue to be operated even though the stockholders get no interest on their money. It is perfectly plain that something must be done about it. Honestly-operated roads must be supported. They must be relieved of some of their burdens if they are going to continue.

"Making corporations marks for extortion cannot go on forever. There must be a distinction made between the corporation which has been honest and decent and those that have robbed the public. The same regulations cannot be continued over both."

### \$351,206,584 INVESTED IN ELECTRIC RAILWAYS IN CALIFORNIA

According to information compiled by the California Electric Railway Association, there are twenty-seven street and interurban electric railways in California. They represent an investment of \$351,206,584, operate 3037 miles of track, with 3348 passenger and 1598 freight cars, and handle about 2,000,000 passengers daily. These railways employ 17,405 persons, who have 50,210 persons dependent upon them for a living. They operate in ninety-one cities and through numerous districts outside of incorporated cities, serving approximately 2,100,000 people. In 1915 they carried 627,533,941 passengers. The gross receipts in 1915 were \$34,147,671, of which \$1,792,752 went to the State as taxes. Approximately 2000 motor vehicles commonly called "jitneys" are now operating in direct competition with the electric railways. Most of these vehicles run on the more profitable and short-haul routes. They charge the one-way or round-trip fare, but do not attempt to meet the low commutation rates of the interurban electric railways. Those competing with the 5-cent local lines do not run to the end of the car routes. Street cars carry passengers in the larger cities distances in excess of 10 miles, with transfers, for a nickel. The average trip of the 5-cent "jitney" does not exceed 5 miles. The statement of the association concludes as follows:

"The future of the electric railways in this State rests with the people. Are they going to permit this unsound condition to continue or will they insist on the enactment of laws that will place this new class of utility on a parity with the electric railway companies as to regulation and taxation?"

### TERMS OF CHATTANOOGA LABOR SETTLEMENT

The agreement entered into between the Chattanooga Railway & Light Company, Chattanooga, Tenn., and its employees, under which the strike of trainmen was settled, will continue in force until Aug. 24, 1917. The company has agreed to employ only members of Division No. 715 of the Amalgamated Association, or those who, if eligible, become members within sixty days after entering the service of the company. The company agreed that when an employee is suspended or discharged the cause of such suspension be furnished the properly accredited officer of the association. Any employee found not guilty, after investigation, of the offense charged against him is to be restored to his former standing with pay for time lost. All men hired between Aug. 20 and the signing of the agreement were to be discharged. The maximum time for any regular scheduled run is not to exceed ten and one-half hours in any one day. The scale of wages is fixed as follows: First six months, 20 cents an hour; second six months, 22 cents an hour; second year, 24 cents an hour; third year, 26 cents an hour; fourth year, 28 cents an hour. Time and one-half is to be allowed for overtime both for platform men and in all other departments. The men on the extra list are guaranteed not less than five hours a day. The wages and conditions in the line department are as follows: Fifty-eight hours shall constitute a week's work with sixty hours' pay. Ten per cent increase in wages, time and one-half for overtime. Scale for apprentice, 17½ cents an hour for first six months; 25 cents raise a day every six months until three years elapse. Standard scale, 30 cents an hour; thirty-one minutes is to constitute an hour's pay. Emergency men are to receive straight time for first ten hours and time and one-half for overtime. Construction men, time and one-half for Sunday and all overtime. Arbitration is provided for as a means of adjusting all questions which arise and cannot be agreed to mutually.

### WAREHOUSES PLANNED BY OWNERS OF CLEVELAND & YOUNGSTOWN RAILWAY

The Cleveland & Youngstown Terminal Company, headed by the Van Sweringen brothers, who are also the promoters of the Cleveland & Youngstown Railroad and principals in the ownership of the Nickel Plate Railroad, announced on Sept. 2 that plans had been completed for a series of warehouses that will have a capacity of 40,000,000 cu. ft. and cost between \$10,000,000 and \$15,000,000. These buildings are to be located along the right-of-way of the Cleveland & Youngstown Railroad between East Ninth and East Thirty-fourth Streets. The buildings are to be constructed of brick, concrete and steel and made fireproof. They will be built in groups from four to eight floors in height, depending upon the individual demand for space. The warehouses are being planned for both storage and distribution purposes. It is estimated that the buildings, as planned at present, will all be completed within five years. Further plans of the Van Sweringen interests include a union station and freight houses to be used by the interurban lines and a number of the steam roads. This building will extend from the south side of the Public Square to the line of warehouses as proposed. Some of the business places on the square are now being vacated in anticipation of the change. The old Forest City House, on the west side of the square, is also being razed to make room for the Hotel Cleveland, a twelve-story structure which is to be erected by the Van Sweringen interests in connection with the depot proposition.

### THREE PROPOSED KENTUCKY ROADS MAY ENTER CINCINNATI

In a report to the Cincinnati Rapid Transit Commission on Sept. 1, Frank S. Krug, chief engineer, discussed the possibility of the entrance to the city of three proposed Kentucky lines, if the use of the Southern Railroad bridge can be secured and the companies are allowed to operate their cars over the rapid transit loop. All three of them would use the same track between Cincinnati and Walton, Ky. From that point south they are separate propositions. One is to be known as the Covington, Big Bone & Carrollton Railway. J. J. Weaver, Ludlow, Ky., is laying out the



line. It will connect Ludlow, Walton, Big Bone, Worthington and Carrollton and may be extended to Madison, Ind. Its length would be 65 miles and it would serve a territory with a population of about 80,000 people. Another road, to be known as the Louisville, Lexington, Maysville & Cincinnati Electric Railway, 120 miles in length, is being promoted by J. C. Blackburn, Dry Ridge, Ky. The third would be 55 miles in length and would connect Ludlow, Falmouth, Cynthiana and Winchester. The three, it is said, would serve a population of 240,000 and would bring 500,000 people into Cincinnati annually. Mr. Krug has recommended a conference between the commission and the promoters of the roads.

**Paris Cars Again Running.**—The street cars of the Paris (Tex.) Transit Company are again operating, by means of power from the plant of the Texas Power & Light Company at Waco. The street cars had been out of commission since the big fire in Paris on March 21, which destroyed the local company's power station and carhouses.

**Cincinnati Commission Has Right to Award Contracts.**—Attorney Frederick L. Spiegel, counsel for the Rapid Transit Commission of Cincinnati, Ohio, has rendered an opinion to the effect that the commission is empowered to award all contracts according to law. The commission had asked an opinion on this matter before making contracts for test holes along the route of the rapid transit loop.

**Sandpoint System Offered to City.**—The directors of the Sandpoint & Interurban Railway, Sandpoint, Idaho, have submitted to the City Council a proposition to sell the entire system to the city. The directors asked the Council to submit the plan to the voters at an early election. The company planned to abandon the system and dispose of the equipment, but this move was protested and it was considered advisable to offer the people a chance to retain the system if the majority desired it.

**Increase in Wages in Galveston.**—Notices have been posted announcing increases in pay affecting 135 trainmen, conductors and motormen employed by the Galveston (Tex.) Electric Company. The increase amounts to nearly 10 per cent, being a flat increase of 2 cents an hour for all employees, regardless of seniority. Under the new scale of wages, which went into effect on Aug. 15, conductors and motormen entering the company's employ will receive 23 cents an hour, while those longest in the service will receive 28 cents an hour.

**Another Boston Tunnel Section to Be Opened.**—The Boston (Mass.) Elevated Railway will equip and operate the Summer Street section of the Dorchester tunnel within the next few months, providing rapid transit train service between Cambridge and the South Station via the Cambridge subway. As the result of a recent conference with the Boston Transit Commission, the Park Street-South Station section of the tunnel will probably be operated without a rental charge, pending the completion of the Dorchester tunnel to Andrew Square.

**Bay State Employees Seek Wage Increase.**—The agreement between the Bay State Street Railway, Boston, Mass., and its employees covering wages expires on Oct. 1. In a new agreement presented to the company the men ask for an increase in wages and changes in the present schedule of runs. The last demands of the union were made in October, 1914. Arbitrators were appointed who awarded the men an advance dating from Oct. 1, 1914, and an additional increase on Oct. 1, 1915. P. F. Sullivan, president of the company, has met the new demand of the union with a request that the carmen go back to the 1914 scale of pay, which was substantially lower than their present rate.

**Question of a New Power Plant at Cleveland.**—Street Railway Commissioner Fielder Sanders has engaged Fred Sargent of Sargent & Lundy, electrical engineers, Chicago Ill., to advise him as to the best course to follow in regard to the Cedar Avenue power plant of the Cleveland Railway, which is rapidly becoming useless. It is said that about \$500,000 would be required to build a new plant and that the cost of abandoning the present plant and installing apparatus for the use of power from outside sources would entail a cost of \$1,000,000. Light Commissioner W. E.

Davis is urging the company to purchase energy from the municipal light plant, but additions costing \$1,750,000 would have to be made to it in order to have the necessary capacity.

**Nashville Men Get Higher Wages.**—The Nashville Railway & Light Company, Nashville, Tenn., has announced a new wage scale. Under this the rate of pay of men who have been in the service of the company for six months and less than one year is increased from 19 to 20 cents an hour; one year to two years, 20 to 21 cents; two years to three years, 21 to 22 cents; three years to four years, 21 to 22 cents; four years to five years, 22 to 23 cents; five years to six years, 23 to 24 cents; and six years and more, 23 to 25 cents an hour. Employees who have served less than six months are not affected. This class will continue to receive 18 cents an hour. All men on the extra list, and assigned to extra runs, swings, and special cars, will receive pay for not less than three hours.

**Changes in Southern Texas Traction Personnel.**—Changes in the operating department of the Southern Texas Traction Company, Dallas, Tex., have been announced by Burr Martin, general manager, to become effective at once. Dan G. Fisher, who has been superintendent of transportation for the Corsicana division, has been transferred to the executive offices, reporting direct to J. F. Strickland, president, and assuming the position of assistant to the president. H. G. Floyd, superintendent of transportation of the Waco division, has become superintendent of transportation for both the Waco and Corsicana divisions and is now the ranking operating official for the Southern Traction Company, exclusive of the properties in Waco, where H. B. Foss will remain in charge of transportation for the terminal properties.

**Conditions in Bangor Practically Normal.**—Since Monday, Sept. 3, cars of the Bangor Railway & Electric Company, Bangor, Me., the employees of which went on strike on Aug. 26, have been operated on regular schedule on the suburban and interurban lines. The city schedule is being operated practically in full. Riding is about 80 per cent of normal. There has been very little violence. All of the new employees are residents of Bangor and Penobscot County. Thomas F. Shine and John H. Reardon are the organizers in charge for the Amalgamated. Parades and public meetings are held almost every night, but outside of a few friends the men who went out are receiving very little support. The strike situation as far as the company is concerned is a closed incident. A visitor to Bangor would hardly notice that there is a strike in force. The Municipal Court Judge fined an engineer of the Maine Central Railroad \$100 and costs for interfering with the operation of cars, indicating clearly that effective means will be taken in dealing with offenders who interfere with the orderly conduct of the business of the company.

**Labor Day Riot in El Paso.**—As the Labor Day parade in El Paso, Tex., concluded many in the parade attacked three cars of the El Paso Electric Railway, the employees of which are on strike, on San Antonio Street, badly wrecking the cars and beating up the operatives. Later three more cars were attacked on Oregon Street by the mob. Police watched the mob for a time without attempting to interfere. Capt. H. Boyd Edwards of the Massachusetts guard hurriedly gathered up a hundred militiamen on the street and, arming them with rifles of the provost guard at the police station, helped the regular provost guard to restore order. Two companies of soldiers were put on duty in the city. Mayor Tom Lea declared he would dismiss the entire force if necessary to enforce order. He placed two men with sawed off shot guns on each street car. A mob later surrounded the Mayor on San Antonio Street in his auto, but armed troops and police came hurrying up and the crowd was dispersed.

**Preparing for the Dallas Straw Vote.**—C. W. Hobson, who with J. F. Strickland proposes to head the new companies that are to take the street railway systems and the electric light plant at Dallas, Tex., out of the hands of the present owners and operate them on a service at cost basis, is now in the East for the purpose of consummating a lease on the Oak Cliff Lines, owned by the Northern Texas Traction Company and controlled by Stone & Webster. An exact undertaking as to the terms upon which these lines



can be leased and operated, since they cannot be purchased, will be given to the voters before the straw ballot is taken to fix the valuation in the controversy between the city and the traction and electric light interests. The taking of the vote, which was referred to at length in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2, is being held up waiting for this detail. Just when the vote will be taken depends upon Mr. Hobson's return. No further conferences are probable before the election, as Mayor Lindsley expects to be out of the city until after the election is held.

**Bids for Special Work Opened.**—During the week ended Sept. 2 the Public Service Commission for the First District of New York opened bids for the supply of seven portions of special work for use in the construction of the new Culver line in Brooklyn, and set Sept. 18, 1916, as the date for the receipt of bids for the installation of tracks for a portion of the same line. The new Culver line in Brooklyn will be an elevated extension of the Fourth Avenue system, while the present Culver line is the surface extension of the Fifth Avenue elevated line. The special work order upon which bids were taken includes the purchase of frogs and switches and incidental materials, and the Ramapo Iron Works, New York, to which the award will probably go, was the low bidder at \$29,859. The contract for track installation will cover the section beginning at a point in private property between Eighth and Ninth Avenues near Thirty-eighth Street and ending at or near Avenue X and Gravesend Avenue. The city will furnish practically all of the necessary materials to the contractor, whose principal item will be the furnishing of labor and a certain amount of hauling.

#### PROGRAMS OF ASSOCIATION MEETINGS

##### Colorado Electric Light, Power & Railway Association

The following tentative program has been arranged for the convention of the Colorado Electric Light, Power & Railway Association at Glenwood Springs on Sept. 21, 22, 23:

- "The Electric Range Game," by H. L. Titus.
- "The New Operating Rules," by F. J. Rankin.
- "Uniform System of Reports and Local Reports," by W. L. Sterne.
- "Tell the Public What You're Doing," by F. P. Weed.
- "Selling Securities to Consumers," by W. F. Raber.
- "Utility Regulations," by M. H. Aylesworth.
- "How You Can Get More Lamps Into Use," by S. E. Doane.
- "The Society for Electrical Development," by H. W. Alexander.
- "Pertinent Remarks on Depreciation and Your Annual Report," by F. W. Herbert.
- "Sensible Rates for Lighting, Cooking and Power," by L. P. Hammond.

The report of the special committee on depreciation will be presented by H. U. Wallace, vice-president and general manager of the Western Light & Power Company.

##### New England Street Railway Club

Those in charge of the outing of the New England Street Railway Club, which will take place at Springfield and Holyoke, Mass., on Sept. 21 and 22, report enthusiastic interest in the affair by members of the club. The local committee has been most energetic not only in preparing a most attractive program for the outing, but in making sure that no one will forget the date. A series of cards have been sent out at intervals with such injunctions as "Don't be a crab! Get away from your business, yourself, or your wife, if necessary, and have a good time by attending the outing of the New England Street Railway Club, Springfield and Holyoke, Sept. 21 and 22." The Holyoke Street Railway has also sent to the members of the club a folder descriptive of Mount Tom at whose summit is one of the most attractive hotels in New England. The program includes a luncheon on Friday at this hotel, which is reached by the lines of the Holyoke Street Railway. All in all, the outing this year promises to outdo even the most successful affairs of similar nature conducted by the club in the past, which is saying a great deal. The full program was published on page 373 of the issue of this paper for Aug. 26.

## Financial and Corporate

### ANNUAL REPORTS

#### Puget Sound Traction, Light & Power Company

The comparative income, profit and loss statement of the Puget Sound Traction, Light & Power Company, Seattle, Wash., for the calendar years 1914 and 1915 follows:

	1915		1914	
	Amount	Per Cent	Amount	Per Cent
Railway department.....	\$4,855,839	64.3	\$5,714,565	67.6
Light and power department...	2,202,337	29.1	2,258,886	26.7
Gas department .....	54,531	0.7	53,325	0.6
Steam heat department.....	312,699	4.1	320,548	4.0
Other earnings .....	134,176	1.8	103,649	1.1
<b>Total earnings .....</b>	<b>\$7,559,582</b>	<b>100.0</b>	<b>\$8,450,973</b>	<b>100.0</b>
Operation .....	\$3,144,738	41.6	\$3,303,868	39.1
Maintenance .....	855,893	11.3	881,988	10.4
Taxes .....	754,132	10.0	821,151	9.7
<b>Total operating expenses and taxes .....</b>	<b>\$4,754,763</b>	<b>62.9</b>	<b>\$5,007,008</b>	<b>59.2</b>
<b>Net earnings .....</b>	<b>\$2,804,819</b>	<b>37.1</b>	<b>\$3,443,965</b>	<b>40.8</b>
Interest charges .....	1,878,779	24.8	1,860,824	22.0
<b>Bond sinking funds.....</b>	<b>\$926,040</b>	<b>12.3</b>	<b>\$1,583,141</b>	<b>18.8</b>
<b>Dividends paid on preferred stock .....</b>	<b>301,205</b>	<b>4.1</b>	<b>258,032</b>	<b>3.1</b>
<b>Dividends paid on common stock .....</b>	<b>\$624,835</b>	<b>8.2</b>	<b>\$1,325,109</b>	<b>15.7</b>
<b>Net direct charges to reserves and surplus .....</b>	<b>\$9,372</b>	<b>0.1</b>	<b>\$52,245</b>	<b>0.6</b>
<b>Surplus .....</b>	<b>\$35,455</b>	<b>0.5</b>	<b>\$59,652</b>	<b>0.7</b>

\*Deficit.

The total earnings for 1915 decreased \$891,391 or 10.5 per cent. The railway department sustained a loss of \$58,725 or 15 per cent, and the light and power department \$56,549 or 2.5 per cent. These unsatisfactory results necessitated the postponement at the last two quarterly dividend dates of half the amount normally payable on the preferred stock.

The railway earnings contracted under jitney and auto-bus competition and the general business depression throughout the Puget Sound district. Jitneys appeared in January and increased rapidly until in February and March about 700 were in operation. The loss in gross earnings for a time exceeded \$2,000 a day. Since then the number of jitneys gradually declined to about 450 at the close of the year. Light and power revenue was reduced by partial or entire suspension of many industries. Several cement plants were thus affected, and practically all sluicing and dredging work, an important factor in 1914, was discontinued. Reduction in commercial and residential light and power rates in the city of Seattle on April 1 also contributed to the loss.

By rigid economy, however, the expenses of "operation" were diminished \$159,130 or 4.8 per cent, while maintenance expenses dropped \$26,095 or 2.8 per cent, and taxes \$67,018 or 8.1 per cent, so that the total expenses and taxes decreased \$252,244 or 5 per cent. The net earnings, therefore, showed a loss of \$639,146 or 12.7 per cent. This decrease, with rises in interest and sinking fund charges, was covered by the aforementioned partial postponement of preferred dividends and the suspension of the \$556,736 of common dividends. Although, the annual report of the company states, present signs of improvement in general business may be of benefit to the utility, the prospects for a rapid recovery are not encouraging.

Expenditures on property, about one-fifth of which were for replacements, amounted to \$1,493,184, as follows: track and paving, \$736,405; transmission and distributing system, \$378,051; power plant, \$67,209; equipment, tools, real estate, steam heat system, gas plant and gas distributing system, \$85,137; miscellaneous (principally riparian rights), \$226,382. In the railway department expenditures were



made for paving and regrading, amounting to approximately \$500,000, and bridges and trestles along the inter-urban lines between Seattle and Tacoma were rebuilt. To reduce accidents twenty Seattle cable cars were converted into "pay on entering" type, and 368 anti-climbers were purchased for cars in Seattle.

#### Montreal Tramways

The income, profit and loss statement of the Montreal (Que.) Tramways for the year ended June 30, 1916, follows:

Gross earnings .....	\$6,609,765
Operating expenses .....	3,707,053
Net earnings .....	\$2,902,712
Deductions:	
City percentage on earnings .....	\$418,083
Interest on bonds and loans .....	806,721
Interest on debenture stock .....	800,000
Taxes .....	93,600
Total .....	\$2,118,405
Net income .....	\$784,307
Dividends .....	323,871
Surplus for year .....	\$460,435
Transfer to contingent renewal account .....	275,000
War tax (two years, 1915-1916) .....	74,013
Transfer to general surplus .....	\$111,422

The gross earnings of the company increased \$84,533 or 1.3 per cent during the last fiscal year as compared to the preceding. The increase came in the latter part of the year, thus indicating a tendency to an improvement in the business conditions of the city. The operating expenses of the company decreased \$6,943 or 0.19 per cent, so that the net earnings increased \$91,478 or 3.25 per cent. The operating ratio in 1916 was 56.08 per cent as compared to 56.92 per cent in 1915.

The sum of \$583,894 was expended during the year on the maintenance of the company's property and charged to operating expenses. This, together with \$313,576 charged to the contingent renewal account for special renewals, made a total expenditure of \$897,470 during the year on the upkeep of the company's property. There was also expended, on capital account, the sum of \$320,872. During the year there was redeemed and cancelled \$163,233 of underlying bonds, making a total of \$1,146,746.

#### Manila Electric Railroad & Lighting Corporation

The statement of income, profit and loss of the Manila Electric Railroad & Lighting Corporation, Manila, P. I., for the year ended Dec. 31, 1915, follows:

Gross earnings .....	\$1,494,787
Operating expenses and taxes .....	762,958
Net earnings .....	\$731,829
Interest on bonds .....	264,975
Surplus over fixed charges .....	\$466,854
Reserves:	
For sinking fund .....	\$41,500
For replacements and renewals .....	80,000
Total .....	\$121,500
Surplus .....	\$345,354
Dividends .....	300,000
Net surplus for the year .....	\$45,354

The gross earnings for the year ended Dec. 31, 1915, showed a decrease from the previous year of \$107,213, or 6.69 per cent. The operating expenses and taxes decreased \$55,455.82 or 6.78 per cent, while the net earnings from operation dropped off \$51,757.64 or 6.6 per cent. Interest charges during the year were \$264,975 and sinking fund requirements were \$41,500, leaving a surplus for the year of \$425,354.

The directors maintained the annual appropriation for the replacement and renewal fund of \$80,000, and deducting this from the year's surplus earnings there remained an available surplus for the year of \$345,354. From this amount there were paid four dividends of 1½ per cent aggregating \$300,000, leaving \$45,354 over all disbursements and reserves. This was transferred to surplus account, making the total accumulated surplus to Dec. 31, 1915, \$1,778,835. Against this amount was charged \$55,000

to provide for a special reserve recommended by the company's auditors, leaving total accumulated surplus and reserves of \$1,723,835. The total dividend payment of 6 per cent in 1915 compared with 7 per cent in 1912, 1913 and 1914, 5¼ per cent in 1911, 4 per cent in 1908, 1909 and 1910, and 3 per cent in 1906 and 1907.

In the railway department the earnings decreased \$107,801, and the operating expenses increased \$5,045. In the electrical department the earnings increased \$22,139, and the operating expenses decreased \$42,568. In the other departments, principally on account of the non-operation of trucks, the earnings decreased \$21,550, and the operating expenses decreased \$29,343. The company's taxes increased \$11,409.

The uncertainty of the future political status of the Philippine Islands created during 1915 a widespread condition of unrest. This condition brought about the almost entire cessation of investment of capital in new enterprises or in already established businesses. Almost all the local industries and business houses followed a policy of retrenchment, causing decreased revenues to the insular and municipal treasuries, which in turn had to resort to the assessment of additional taxes. The government and municipalities also stopped to a great extent all improvements and new public works. The available shipping to and from Manila was so scarce that all lines of trade suffered, and freight rates rose so high as to be almost prohibitive. Now that the political situation has been clarified to a great extent, however, it is thought that business conditions will begin to improve.

#### OPERATING FIGURES FOR THREE ENGLISH CITIES

The annual report in connection with the South Shields Corporation Tramways states that the total revenue for the twelve months ended March 31, 1916, amounted to £41,826, an increase of £1,981 as compared with the previous year. Female laborers were first used in November to take the place of male conductors, and they have adapted themselves to the work splendidly. It has not been possible, however, to fill all the vacancies caused by the absence of motormen, and the service had had to be reduced at a time when an increased service was required. During the year the ratio of pay had been increased to nearly all the employees by 1 halfpenny an hour, and the standard rate is now one of the highest of any tramway system in the country. The total working expenses, including £1,932 paid to dependents of employees who had joined the forces, was £26,317. After meeting interest and sinking fund charges a net profit of £6,504 remained, as compared with £5,594 for the previous year.

In the annual report of the city engineer for Newcastle, it is stated that the length of tramway opened for service, measured as single track, is 66.5 miles. The maintenance of the permanent way has been £9,545, equivalent to £143 per mile of single track, or 0.40d. per car mile. In addition to ordinary maintenance, £1,580 was expended in renewals, equivalent to £24 per mile of single track, or 0.06d. per car mile, so that the total cost of the permanent way (exclusive of capital charges) was £11,125, equivalent to £167 per mile of single track or 0.46d. per car mile. A considerable length of the permanent way is in urgent need of renewal, but the great difficulty in obtaining a sufficient supply of labor has prevented the work from being undertaken. The major portion of the track has been in use for nearly fifteen years. Consequently, the fact that the present heavy service on a permanent way having many steep gradients is maintained at such a comparatively small cost, is satisfactory, but it is inevitable that the cost will be greatly increased as soon as opportunity will permit of renewals being carried out.

The receipts of the Southampton Corporation Tramways for the last year amounted to £79,828, as compared with £71,037 for the previous year, the highest figure up to that date. The passengers carried numbered 15,494,365, an increase of 2,228,651. The mileage run was 1,636,103, as compared to 1,703,032, a decrease of 66,929. The total receipts averaged 11.710d. per mile, as compared to 6.851d. A total of 135 members or 39 per cent of the permanent staff have enlisted, and more than sixty women are now regularly employed as conductors.



## REPORT FOR DISTRICT OF COLUMBIA

The annual report of the Public Utilities Commission of the District of Columbia for the calendar year 1915 states that during the year the commission authorized \$512,200 in bonds and \$10,360 in stock, there remaining pending at the end of the year applications for \$922,614 of bonds and \$33,940 of stock. The commission continued its valuation work, and it was estimated that the valuations of the larger utilities would be completed during the first half of 1916. The report of the commission contains miscellaneous operating figures for the individual utilities, some for electric railways being given in the accompanying table:

MISCELLANEOUS OPERATING STATISTICS FOR ELECTRIC RAILWAYS IN DISTRICT OF COLUMBIA FOR YEAR ENDED DEC. 31, 1915

Name	Total Revenue from Transportation			Total Operating Revenues			Total Operating Expenses			Average Fare Per Passenger	
	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	Revenue Carried	Per Passenger (Including Transfers)
Capital Traction Company...	\$2,191,935	0.28056	2.61481	\$2,206,493	0.28242	2.63218	\$1,152,283	0.14749	1.37459	\$0.04296	\$0.03214
Washington Railway & Electric Company.....	2,109,904	0.27174	2.27563	2,411,206	0.31055	2.60060	1,434,395	0.18474	1.54706	0.04310	0.03227
City & Suburban Railway...	573,925	0.26250	2.31701	584,193	0.26720	2.35846	375,712	0.17184	1.51650	0.04247	0.03405
Georgetown & Tennallytown Railway.....	71,856	0.19868	2.16859	72,365	0.20009	2.18395	64,259	0.17768	1.93932	0.04286	0.02975
East Washington Heights Traction Railroad.....	7,944	0.15273	1.14551	7,944	0.15273	1.14551	5,169	0.09939	0.74543	0.04256	0.02142
Washington-Virginia Railway	490,794	0.27029	3.11817	498,541	0.27456	3.16739	238,761	0.13149	1.51693	0.08988	0.08988
Washington Interurban Railway.....	18,624	0.13230	1.27280	18,624	0.13230	1.27280	19,653	0.13960	1.34307	0.04082	0.04082
Washington & Maryland Railway.....	6,100	0.10069	0.65546	6,100	0.10069	0.65546	16,605	0.27409	1.78420	0.03110	0.01801
Washington & Old Dominion Railway*											

\*The Washington & Old Dominion Railway operates trains by both steam and electricity.

**American Public Utilities Company, Grand Rapids, Mich.**—The gross sales of all subsidiaries of the American Public Utilities Company totaled for the year ended June 30, 1916, \$3,309,586 as compared to \$2,932,069 in the preceding year, an increase of 12.88 per cent. The gross earnings of the railway property in Eau Claire showed a gain of 8.08 per cent. The condition of the Jackson Light & Traction Company improved during the year. Competition from jitneys seems to have been almost entirely removed by municipal regulations requiring bonds and licenses.

**Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.**—A petition has been filed by the majority bondholders of the Birmingham, Ensley & Bessemer Railroad with the Alabama Public Service Commission asking for the consolidation of the system with the Birmingham Railway, Light & Power Company. Under an act passed by the last Legislature the consolidation of such public utilities is allowed, provided the consent of the Public Service Commission is obtained. That body has set Oct. 2 as the date at which the hearing will be conducted. The Birmingham, Ensley & Bessemer Railroad has been in receiver's hands for two years.

**East Washington Heights Traction Railroad, Washington, D. C.**—In an order dated Aug. 24 the Public Utilities Commission of the District of Columbia has set the reproduction cost of the East Washington Heights Traction Railroad at \$34,978 as of Nov. 1, 1914. The reproduction cost, less depreciation, was fixed at \$28,009. In addition to these values the commission found the following: Expended in the construction and equipment of the utility, as shown by the utility's records, \$58,020; subscribed by stockholders, \$14,800; proceeds of bonds sold, \$16,000; and proceeds of notes issued, \$27,220. The accrued depreciation, as shown by the utility's records, was nil, while the accrued depreciation as found by the commission totaled \$6,969. In its order the commission annual rates of depreciation to be based on the reproduction cost new of property on hand on Nov. 1, 1914, and on the original cost of property subsequently acquired, of 2.86 per cent for way and structures, 3.87 per cent for equipment, and nil for land.

**Hudson & Manhattan Railroad, New York, N. Y.**—The board of directors of the Hudson & Manhattan Railroad at a meeting on Aug. 31 declared the interest earned on the adjustment income mortgage bonds for the six months ended June 30, 1916, at the usual rate of 2 per cent per annum, or \$10 per \$1,000 bond for the period. This interest is payable on Oct. 1, 1916, at the office of the company's fiscal agents, Harvey Fisk & Sons, New York City.

**Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.**—Federal Judge Wil-

bur F. Booth has authorized C. P. Bratnober, receiver of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, to issue \$100,000 of receiver's certificates to take care of obligations existing now or expected to arise. It is stated that the attorneys at the hearing said that the creditors had not come to a decision as to what should be done about the terminal agreement with the Electric Short Line. Action on that matter was postponed. Obligations to be met out of the certificates which the receiver will issue include \$15,000 expected deficit within the next sixty days, \$35,000 to close up right-of-way claims, \$24,000 to pay overdue taxes with penalties and \$2,500 in traffic

balances to the other roads. It is stated that the road needs \$1,500 a month to keep up its terminal contract and that a \$15,000 instalment is due on its contract for terminal land bought of T. B. Walker. Action on these latter matters was delayed.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—A special meeting of the stockholders of the Northern Ohio Traction & Light Company has been called for Oct. 2 to vote on increasing the authorized amount of 6 per cent preferred stock from \$5,000,000 to \$10,000,000, and common stock from \$9,000,000 to \$10,000,000. The increase in capitalization is to facilitate financing of the company by new interests which will be in control after Sept. 15. The arrangements for the sale of the property to E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, were noted in the ELECTRIC RAILWAY JOURNAL of Sept. 2, page 418.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—The gross revenues of the Oakland, Antioch & Eastern Railway for the twelve months ended June 30, 1916, totaled \$629,928, as compared to \$542,039 for the preceding year, an increase of \$87,889 or 16.2 per cent. During these same periods the operating expenses at \$425,402 and \$412,989 showed an increase of only \$12,413 or 3 per cent. The net earnings of \$204,526 for the last year therefore showed a gain of \$75,476 or about 58 per cent. The freight business of the company is showing special improvement, for the total gain of \$14,813 in gross for the month of June, 1916, included \$6,159 for freight, more than an 80 per cent gain over June, 1915.

**Ohio Utilities Company, Columbus, Ohio.**—The Ohio Utilities Company has applied to the Ohio Public Utilities Commission for authority to issue \$750,000 of 6 per cent first mortgage bonds, \$200,000 of preferred stock to pay not more than 7 per cent dividends, and \$100,000 of common stock. The company has also requested permission to purchase the property of the Circleville Light & Power Company for \$169,500, the Gallipolis Electric & Power Company for \$91,600, the Delaware Electric Light, Heat & Power Company for \$231,700, and the Chillicothe Electric Railroad, Light & Power Company for \$480,000, or a total of \$972,800. This would allow the company \$27,200 for working capital and \$50,000 for extensions and betterments. John P. Phillips, vice-president of the Chillicothe Electric Railroad, Light & Power Company, is president of the Ohio Utilities Company, which was recently organized with an authorized capital stock of \$500,000. Attorney J. C. Martin is secretary of the company.

**Omaha, Lincoln & Beatrice Interurban Railroad, Omaha, Neb.**—The Omaha, Lincoln & Beatrice Interurban Railroad



has applied to the Nebraska Railroad Commission for authority to issue \$2,000,000 of common stock and \$500,000 of preferred stock and \$2,500,000 of bonds.

**Pacific Electric Railway, Los Angeles, Cal.**—The annual report of the Pacific Electric Railway for the year ended June 30, 1916, to the California Railroad Commission shows a deficit of \$821,734 in the company's earnings. The total operating revenues for the year were \$8,856,796, while the total railway operating expenses were \$5,994,611, which left a net revenue from railway operations of \$2,862,185. From this \$515,556 was taken for taxes. Other income amounted to \$37,301, making the gross income of the railway \$2,383,929. From this \$3,205,664 was deducted for interest on bonds and floating debt, bond discounts and rents, which caused a deficit in the company's earnings of \$821,734. The jitney bus and other automobile passenger carrying traffic are blamed mostly for these results. The railway operates in fifty-four towns in southern California, and very large sums have to date been spent on improvements in the various places.

**Philadelphia (Pa.) Rapid Transit Company.**—The Philadelphia Stock Exchange has authorized the listing of \$1,880,000 of additional extended voting trust certificates of the Philadelphia Rapid Transit Company, making a total of \$18,847,500 of these outstanding.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—The St. Joseph Railway, Light, Heat & Power Company has applied to the Missouri Public Service Commission for permission to create a new bond issue of the authorized principal amount of \$15,000,000, to secure first and refunding mortgage sinking fund 5 per cent thirty-year gold bonds, due in 1946. The company and its subsidiary, the St. Joseph & Savannah Interurban Railway, also have asked the commission for authority to execute a joint mortgage to secure the new bond issue. Under the terms of the proposed mortgage, provision is made for the delivery by the trustee to the company of \$826,000 of bonds, \$326,000 thereof to take the place of an equal amount of first mortgage bonds of the St. Joseph & Savannah Interurban Railway now outstanding, but which will be cancelled, and the mortgage securing the same discharged. The proposed new mortgage further provides for the setting aside of bonds to retire, by exchange or otherwise, the present closed first mortgage issue of the St. Joseph Railway, Light, Heat & Power Company of the principal amount of \$5,000,000, which matures in 1937. The balance of the bonds will be held by the trustee to provide for future extensions and additions to the property. Simultaneously with the execution of the new mortgage, the properties of the St. Joseph & Savannah Interurban Railway, which include a 12-mile line between St. Joseph and Savannah, will be transferred to the St. Joseph Railway, Light, Heat & Power Company, subject to the new mortgage. The properties will thus be consolidated, with the proposed mortgage covering the interurban property as a first lien and the St. Joseph Railway, Light, Heat & Power Company properties as a second lien. A meeting of the stockholders of the company to pass upon the mortgage will be held on Sept. 28, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26 page 376.

**Sapulpa & Interurban Railway, Sapulpa, Okla.**—The Sapulpa & Interurban Railway, which operates 5 miles of track from Sapulpa to Keifer, has been sold at public sale by the sheriff of Tulsa County to the Midland Valley Railroad. It is said that the Midland Valley Railroad, an operating steam road with main offices in Philadelphia, will build a connecting link between Keifer and Glenpool, a distance of 4 miles. The impending sale of the road was referred to in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26, page 376.

**United Light & Railways Company, Grand Rapids, Mich.**—Announcement has been made that the United Light & Railways Company has declared a quarterly dividend of 1 per cent on its common stock and a regular quarterly dividend of 1½ per cent on its preferred stock, both payable on Oct. 2 to stock of record of Sept. 15. The United Light & Railways Company discontinued dividends at the rate of 1 per cent quarterly on its common stock in July, 1914. The declaration which has now been made marks the resumption of the common stock dividend at the regular 4 per cent a year rate.

## DIVIDENDS DECLARED

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1½ per cent, prior preferred.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2½ per cent, common.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, \$4.50.

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., quarterly, 1½ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., \$3.

Third Avenue Railway, New York, N. Y., quarterly, 1 per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

United Traction & Electric Company, Providence, R. I., quarterly, 1½ per cent.

## ELECTRIC RAILWAY MONTHLY EARNINGS

### BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '16	\$72,642	\$39,318	\$33,324	\$17,632	\$15,692
1 " " '15	68,146	37,948	30,198	17,462	12,736
12 " " '16	805,386	433,219	372,167	211,578	160,589
12 " " '15	780,845	378,809	402,036	211,633	190,403

### CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., July, '16	\$102,884	\$65,613	\$37,271	\$30,067	\$7,204
1 " " '15	90,116	63,458	26,658	30,337	3,679
12 " " '16	1,195,120	750,209	444,911	357,072	87,839
12 " " '15	1,039,521	709,345	330,176	351,820	21,644

### COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., July, '16	\$287,226	\$173,447	\$113,779	\$42,862	\$70,917
1 " " '15	239,594	146,303	93,291	40,232	53,059
12 " " '16	3,354,689	1,961,205	1,393,484	504,364	889,120
12 " " '15	3,057,558	1,816,271	1,241,287	470,860	770,427

### COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., July, '16	\$1,379,381	\$764,743	\$614,638	\$417,865	\$196,773
1 " " '15	1,182,520	654,686	527,834	365,166	162,668
12 " " '16	16,009,772	8,542,235	7,467,537	4,885,185	2,582,352
12 " " '15	14,072,518	7,565,138	6,507,380	4,327,623	2,179,757

### CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., July, '16	\$264,023	\$159,786	\$104,237	\$69,423	\$34,814
1 " " '15	262,080	141,245	120,835	64,819	56,016
12 " " '16	2,761,786	1,653,046	1,108,740	794,467	314,273
12 " " '15	2,555,338	1,453,628	1,101,710	778,734	322,976

### EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., July, '16	\$258,367	\$151,584	\$106,783	\$62,987	\$43,796
1 " " '15	200,599	122,023	78,576	63,645	14,931
12 " " '16	2,760,532	1,642,212	1,118,320	751,943	366,377
12 " " '15	2,448,863	1,452,450	996,413	758,115	238,298

### GRAND RAPIDS (MICH.) RAILWAY

1m., July, '16	\$113,948	\$73,043	\$40,905	\$19,173	\$21,732
1 " " '15	105,596	72,022	33,574	13,933	19,641
12 " " '16	1,263,820	835,117	428,703	171,907	256,796
12 " " '15	1,216,108	833,416	382,692	163,523	219,169

### LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., July, '16	\$83,759	\$51,196	\$32,563	\$15,214	\$17,349
1 " " '15	75,376	44,683	30,693	15,949	14,744
12 " " '16	772,132	508,869	263,263	191,518	71,745
12 " " '15	706,709	463,361	243,348	187,996	55,352

### NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., July, '16	\$199,043	\$125,137	\$73,906	\$42,248	\$31,658
1 " " '15	166,927	109,847	57,080	42,896	14,184
12 " " '16	2,283,640	1,409,218	874,422	514,590	359,832
12 " " '15	2,163,788	1,281,341	882,447	493,588	388,859

### NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., July, '16	\$481,143	\$287,692	\$193,451	\$48,641	\$144,810
1 " " '15	371,736	219,704	152,032	51,804	100,228
7 " " '16	2,860,642	1,720,266	1,140,376	355,006	785,370
7 " " '15	2,128,387	1,321,350	807,037	360,270	446,767

### PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., July, '16	\$448,219	\$255,256	\$192,963	\$181,780	\$11,183
1 " " '15	467,946	260,486	207,460	183,947	23,513
12 " " '16	5,437,240	3,069,517	2,367,723	1,839,891	177,832
12 " " '15	5,694,808	3,103,158	2,591,650	2,210,534	381,116

\*Includes taxes. †Deficit.



## Traffic and Transportation

### SAFETY CAMPAIGN STARTED IN KANSAS CITY

For the First Time the Work Will Be Carried Into the Public Schools

Plans have been completed by the Kansas City (Mo.) Railways, through the aid of the Board of Education, the Commercial Club and other industrial institutions, for a general safety campaign in Kansas City. For the first time the safety work will be carried on in the schools of the city. The Board of Education on July 6 authorized the company to place safety blotters, calendars and other literature in the schools under the direction of Superintendent I. I. Cammack.

A calendar will be placed in every school room and in other places throughout the city. More than 500,000 blotters will be distributed among the school children during the school year. Each child will receive one blotter each month. The blotters are in four colors. Each one carries a safety motto pertaining to the month issued, a small calendar for that month and the words, "Safety and Service," with the name of the company. The large calendars which will be displayed in the school rooms carry the designs that are on the blotters. These designs are grouped at the top with a motto under each design. In the center is the company slogan of "Safety and Service" in a circle with the name of the company worked about the slogan. The calendars start with the month of September, 1916, and end with August, 1917. They are printed in the same colors as the blotters and are on heavy cardboard.

The Board of Education also authorized the distribution of safety league buttons among the children. These buttons will carry the colors of the various schools and the name of each school with the words, "Safety League."

At the suggestion of Superintendent I. I. Cammack it was decided to introduce large bulletins into each room to carry on the educational campaign in connection with the hygienic work. Superintendent Cammack also suggested that motion picture films, showing the price of carelessness and the necessity for always being on the safe side, be exhibited in all the school rooms equipped for such moving pictures. This suggestion has been adopted by the company. In this connection lectures will be given. More than half of the school buildings in the city are equipped for motion picture shows. Additional literature for the pupils may be prepared as the months progress. All this will be done under the direction of Mr. Cammack.

W. S. Woodland, who has been one of the company's supervisors for several years, will be in charge of the company's work. He will be known as the railways safety director. Mr. Woodland will work under a general safety committee consisting of the superintendent of efficiency, the publicity agent and a member of the legal department. This committee will supervise the work in the schools, the other public work and aid in the direction of the safety work to be conducted among the employees of the company. The company is a member of the National Safety Council and arrangements have been made for organizing a Kansas City safety council. Membership in this council will embrace all the leading industrial concerns in Kansas City, Mo., and Kansas City, Kan.

The campaign will be taken up among vehicle drivers and owners. The first step in this direction will be the issuance of form letters to all drivers and owners urging them to do all they can to promote the general safety movement. This will be followed by placards to be placed in all stables and garages. In addition to this there will be talks by members of the council and others on the necessity for safety. This work will be carried on by the general safety committee. In the general public work there will be a new series of dash cards that are practically ready for issuance. Safety suggestions will also be carried on the backs of transfers and on the stationery of the Kansas City Railways.

### PRELIMINARY STATEMENT ON SEATTLE JITNEY REGULATION

William Hickman Moore, chairman of a special committee appointed by the City Council to draft proposed jitney bus regulations in Seattle, Wash., states in his opinion the people of this city want the jitney as a transportation fixture, and for that reason the committee will exercise great care in formulating its report and submitting a proposed ordinance to the Council. Chairman Moore said:

"The problem of adequate transportation at reasonable rates to all sections of the city looms up large at this time, because of the complications the auto bus has injected. The settlement of the problem of adequate transportation should not be approached with the thought that the traction company is to be protected as a mere money-making machine operated for the benefit of its stockholders; that jitney owners are to be permitted to earn a living, unrestrained by regulations, or that the public shall finally own and operate all public utilities. The problem is one in which the home owner is interested. Should a zone system be brought about through reduced earnings of the traction company, many home-owners will be compelled to return to the congested districts to escape excessive transportation charges. Establishment of a zone system of fares would be a calamity for the small property owner, and it is imminent unless the transportation problem is settled with fairness to all. The street railway must be regarded as the backbone of a dependable transportation system, and competition which will arrest the development of that system would, without question, retard the development of the city and stifle its growth. Should the petition of the street railway to the Public Service Commission be granted, the city would be deprived of a 2-per cent revenue on the gross earnings of the company, which in 1914 amounted to \$72,934 and in 1915 to \$61,581. The smaller amount in 1915 is attributed by the company to jitney bus competition. The paving of an 18-ft. strip by the street railway has in many instances made possible the paving of the remaining portion of the street by the property owners, where the limit of assessment would otherwise have prohibited the improvement. If the petition of the company be granted by the Public Service Commission, this additional burden would fall upon the property owner. A release from payment of a portion of the cost of bridges would also fall upon the general taxation."

At this time the Puget Sound Traction, Light & Power Company is petitioning the Public Service Commission to be released from some of its franchise obligations considered by the company to be unreasonably burdensome.

### EXPLAINING THE COMPANY'S SIDE

That a frank and courteous presentation of the company's side of a question by company officials to the public is a potent means of establishing better public relations, if not of settling the question itself, is well shown by the following excerpt from the *Denver Tramway Bulletin* for August:

"Golden has been demanding, through her newspapers and Council, that the fare to that city be cut one-half. Study of the question proved that a reduction could not be allowed, and on Friday evening, Aug. 4, General Manager Hild met with the Mayor and Council in a meeting open to the citizens of Golden to explain why a reduction could not be granted. His talk, which was illustrated by lantern slides, was based on such good common sense that the discussion which followed was pleasant and resulted in practically everyone assenting to Mr. Hild's statements.

"The Eighteenth Street Improvement Association met on Aug. 3 to demand greater service on Eighteenth Street. H. C. Kendall, traffic engineer, was present with figures which showed conclusively that there was not sufficient short-line travel during the day on Eighteenth Street to permit increased service at additional expense, and that in spite of the light traffic Eighteenth Street was being given several times as much service as other lines doing a similar business. The explanation of the company seemed to be reasonable and the consideration of Eighteenth Street's needs fair to most of the association members, in spite of a resolution adopted asking for increased service."



### CLEVELAND INTERURBAN TO START FREIGHT SERVICE ON OCT. 1

Plans of the Manufacturers and Wholesale Merchants' Board of the Cleveland Chamber of Commerce will have been at least partially consummated on Oct. 1, when the Cleveland, Southwestern & Columbus Railway inaugurates a freight service on its two southern divisions. An ordinance was passed by the Cleveland City Council some years ago providing for the operation of freight cars through the city after 10 o'clock in the evening, but this is the first road to take advantage of it. The ordinance was subjected to a referendum vote, but through this board a favorable result was secured. The service will include cities and towns with a combined population of more than 100,000. For the Bucyrus division there will be a daily through three-car train each way, one starting from each end of the division. A train, making the round trip, will furnish service on the Wooster division. Carl J. Laney, traffic manager of the road, will have charge of the freight service. The rates differ in some respect from the steam road rates. It is said that this service will result in the delivery of freight to most of the towns the road touches in a much shorter time than over steam roads from other places and that Cleveland will, therefore, profit much by it. A freight depot is being built beside the express depot of the Electric Package Company at East Ninth Street and Eagle Avenue, Cleveland.

**Winston-Salem Considers Jitney Measure.**—The aldermen of Winston-Salem, N. C., have decided not to eliminate the jitney from any street by ordinance, but to require that the routes and schedules to be maintained by each car be inserted in the application for franchise and that this be considered by the board in passing upon the license. The bond is placed at the minimum of \$10,000 for four cars and under, and \$500 for each additional car. The matter of license to be paid to the city has been discussed, but no definite conclusion was reached in that matter.

**Decrease in Dallas Jitneys.**—The semi-annual jitney licenses issued by the city of Dallas, Tex., have just expired and it is interesting to note that 425 of the 465 licenses have been renewed. This means a decrease of forty jitneys in Dallas during the last six months. Plans for the relief of traffic congestion in the business district are receiving consideration of the City Commissioners of Dallas. If adopted they will confine the operation of jitneys to streets on which there are no car lines. The regulations contemplated are similar to those put into effect in the city of San Francisco, Cal., and described previously in detail in the *ELECTRIC RAILWAY JOURNAL*.

**Six-Cent Fare Allowed.**—The Bristol & Norfolk Street Railway, Randolph, Mass., on Sept. 2, received notice from the Massachusetts Public Service Commission that the local passenger tariff filed some time ago providing a 6-cent fare had been allowed. Under the new schedule the fare of 6 cents will be charged from Holbrook station, in Randolph, to the corner of Turnpike and Page Streets, North Stoughton, and from that point to Washington Street, Stoughton, another 6 cents will be charged. A workingman's fare of 6 cents for the entire trip will be allowed by the company for two hours in the morning and two in the afternoon. School tickets in strips of ten will be sold for 30 cents. It was expected that the change in fare would go into effect on Sept. 10.

**Changes in Children's Fares in Vancouver.**—The franchise of the British Columbia Electric Railway, Vancouver, B. C., requires the company to carry two children under twelve years of age for one regular fare and to issue tickets to school children at a rate of ten for 25 cents. Under these regulations the company would be entitled to charge full fare for a single child not possessing school children's privileges. It has decided, however, to extend the privilege of school children's tickets at all times to any child five years of age and under twelve for whom half fare must now be paid. Two children of these ages may travel for 5 cents or for a green or red ticket. Children under five years may travel free. The franchise requires the company to carry only infants in arms free. School children over

twelve may travel on school tickets between 8 a. m. and 5 p. m., except on Saturdays or Sundays.

**Peculiar Succession of Accidents.**—One street car was demolished, another was damaged, two automobiles were damaged and a wagon was smashed up as a result of a peculiar accident on Aug. 19 at Rittersville, on one of the lines of the Lehigh Valley Transit Company, Allentown, Pa. A truck driver, dazzled by an automobile headlight, first came into collision with an open street car. A short distance behind the open car came an interurban car, which ran into the wreck on account of the dust surrounding it and the lack of time to apply brakes. In the meantime, however, an automobile touring car and a two-horse wagon were over-anxious to get by the first pile-up, with the result that they were both caught in the second smash, which completely demolished the open street car. Several persons were hurt, but only the truck driver seriously. The fact that the open car contained no passengers prevented many fatal accidents.

**Illinois System Preparing for State Fair.**—The operating and traffic departments of the Illinois Traction System; Peoria, Ill., are making elaborate preparations for handling traffic to and from the State Fair at Springfield, Ill., on Sept. 15-23. This company is the largest transportation feeder to the big exposition, as it enters the city from three directions and handles annually thousands of State Fair visitors. Low rates have been named from all points effective on Sept. 15, with return limit Sept. 25. Special schedules have also been prepared, and regular trains will run in sections and with trailers attached as the traffic demands. As is customary, the company will maintain an information bureau on the State Fair grounds, where representatives of the State Board of Agriculture and the traction system will furnish information concerning all railway schedules and the fair itself. The company will give away a new souvenir in the shape of an up-to-date and complete railway map of the State.

**Who's a "Jay"?**—This is the explanation of a "jay," as contained in the August issue of *Safety*, the magazine of the Union Traction Company of Indiana: "A 'jay' walker, 'jay' driver, and 'jay' chauffeur is one who cuts across the street at all kinds of angles, at crossings, in the middle of the block, or any place else, thereby endangering all others in his class, as well as jeopardizing his own safety, and especially increasing his liability to car collisions. A 'jay' rider is a Union Traction employee, not excepting the official class or the semi-official class, who persists in doing things that the ordinary passenger is not expected to do, such as smoking and riding on the rear platform and steps; riding in the baggage room and talking to the motorman; shifting the material in the baggage room to increase his comfort; getting on and off at the front end, when the rear steps should be used; stalking through the car as an indication of ownership; seeking special favors from the car crew, via sending and receiving word through the dispatcher's office.

**Newspaper Selling Stopped on Kansas City Cars.**—To insure safety for newsboys, scores of whom have been injured jumping on or off cars, the Kansas City (Mo.) Railways at the suggestion of the Board of Public Welfare has decided to abolish the practice of permitting boys to sell papers on the cars. The actual work of securing the new order started with the welfare department of the company as a feature of its public safety work. The order has met with the hearty indorsement of the *Kansas City Star*, *Times* and *Post*. It is being enforced without difficulty or complaint. Three years ago the Metropolitan Street Railway issued an order to the same effect, but withdrew it after a few weeks of futile efforts at enforcement. Recently the Kansas City Railways prepared a statement indicating the cost of the newsboys to its stockholders. About \$25,000 a year was chargeable to the freedom of newsboys on the cars. In one month thirty-two claims of newsboys were paid, ranging from \$10 to \$500. There were several death claims of \$5,000 each in the last two or three years. While these claims were called newsboy claims, it was well known that many of the injured were not newsboys, but boys who had got hold of newspapers and were using them as the excuse for riding free.



## Personal Mention

**T. L. Miller** has been appointed vice-president and efficiency engineer of the Fort Wayne & Northern Indiana Traction Company, with headquarters at Fort Wayne, Ind.

**Minot J. Hill**, general manager of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., is now consulting manager for Martin & Company, Philadelphia, who financed the Salem & Pennsgrove Traction Company line.

**A. B. Brown**, who has been in the employ of the Texas Traction Company, Fort Worth, Tex., since the interurban railway between Sherman and Dallas was built, has been made assistant to M. J. Loftus, superintendent of transportation.

**Harry D. Frueauff** has resigned as treasurer and manager of the City Light & Traction Company, Sedalia, Mo., to become general manager of the Montgomery Light & Water Power Company, Montgomery, Ala. Both properties are controlled by the Doherty interests.

**Louis A. Pease** has been appointed division superintendent of the Western division of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to succeed C. Earl, deceased. Mr. Pease has been a conductor on this line since the present company acquired the property.

**William Heener** has succeeded A. L. Bowen as engineer of the power station of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind. Mr. Keener has also succeeded Mr. Bowen as chief engineer of the Indianapolis & Northwestern Traction Company.

**Lawrence W. Jackson**, who has been local auditor of the Alabama Power Company in Anniston for several years, has been appointed acting manager of the local operations to succeed A. L. Kenyon, resigned, who retires from the company on Oct. 1 to take a managerial position at Columbia.

**Frederick S. Pratt**, chairman of the board, and **Thomas Nelson**, **Thomas N. Perkins** and **Stedman Buttrick**, members of the executive committee of the board of directors of the Puget Sound Traction, Light & Power Company, have been in Seattle on a tour of inspection of the property.

**Dan G. Fisher**, who has been superintendent of transportation for the Corsicana division of the Southern Texas Traction Company, Dallas, Tex., has been transferred to the executive offices, reporting direct to J. F. Strickland, president, and assuming the position of assistant to the president.

**C. F. Berry**, who has been clerk of the Lewiston, Augusta & Waterville Street Railway, Portland, Me., has also been made treasurer of the company, to succeed Charles A. Pearson, Jr., Philadelphia. Mr. Berry is also treasurer and clerk of the Cumberland County Power & Light Company, Portland.

**E. N. Strait**, who for the last ten years has served in the engineering and statistical departments of the Wisconsin Railroad Commission as inspector and public utilities expert, has joined the organization of H. M. Byllesby & Company, Chicago, Ill., as assistant to Arthur S. Huey, vice-president in charge of operation.

**William F. Pfennig**, accountant for Stone & Webster, who has been connected with the Houston (Tex.) Electric Company for the last ten years, has been transferred to the Boston office of the company. Prior to his departure from Houston, Mr. Pfennig was a guest at a luncheon at the Rice Hotel, the host being David Daly, manager of the Houston Electric Company.

**John P. Phillips**, vice-president of the Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio, has been elected president of the Ohio Utilities Company, incorporated recently to consolidate the Circleville Light & Power Company, the Gallipolis Electric & Power Company, the Delaware Electric Light, Heat & Power Company, and the Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio.

**Simon Bamberger**, formerly president of the Salt Lake & Ogden Railroad, which operates between Salt Lake City and Ogden, Utah, a distance of 36 miles, is the Democratic nominee for Governor of the State of Utah. Mr. Bamberger was born in Darmstadt, Germany, in 1847. In 1915 he retired from the active management of his varied and extensive interests and has since then indulged in recreation and travel.

**Horace E. Allen**, formerly of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed assistant general superintendent of the Michigan Railway, Jackson, Mich. Mr. Allen was graduated from the Massachusetts Institute of Technology. After completing his electrical engineering course he accepted a position with the Westinghouse Electric & Manufacturing Company, and in 1910 he became connected with the Toledo Railways & Light Company under J. F. Collins, then assistant general manager.

**George A. Smith**, who has been appointed assistant general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, Cedar Rapids, Iowa, was connected for twenty-two years with the Chicago & Great Western Railroad as messenger, operator and local agent at several of that company's stations, for three years as traveling freight agent in the Pittsburgh territory and for two years as division freight and passenger agent at Chicago. He resigned from the latter position and engaged in the real estate business. Two years later he re-entered steam railroad work as traveling passenger agent for the Southern Pacific Company in the Pittsburgh territory. He resigned from the Southern Pacific Company to become connected with the Waterloo, Cedar Falls & Northern Railway.

**J. B. Duvall** has been appointed by President W. A. House of the United Railways & Electric Company, Baltimore, Md., as superintendent of the welfare department of the company. For many years the company has displayed a substantial interest in the welfare of its employees, aiding them in sickness and in time of distress and caring for those who have become incapacitated for work. The welfare work of the organization has heretofore been assigned by Mr. House to various committees of officials, but its growth finally made such demands upon their time that it was found necessary to put some one competent person in direct charge as the executive officer, and Mr. Duvall was selected for this post. He has been in the claim department of the company for many years and his long training and general efficiency are such as peculiarly to adapt him for the new position.

**W. Stanley Woodland** has been chosen safety director for the Kansas City (Mo.) Railways. Mr. Woodland will have charge of all the safety work to be done by the company. He will work under the direction of the general safety committee. Mr. Woodland was born in Crisfield, Md., on Nov. 12, 1886. He began his street railway career nine years ago at Key West, Fla., where he was employed by Stone & Webster in the power house department. He remained there for two years. In January, 1909, he resigned and went to Beaumont, Tex. At Beaumont he was engineer in a power house of the Beaumont Traction Company, later being promoted to chief engineer of the power house. He remained there until the close of the year, when he resigned to enter the transportation department of the Missouri & Kansas Interurban Railway Company as a trainman. Mr. Woodland remained in the employ of that company until April, 1910, when he went with the Kansas City Railways as night clerk at Twenty-ninth and Southwest Boulevard division. Later he was night clerk at the Ninth and Brighton division, then day clerk at Ninth and Brighton, then assistant supervisor at Ninth and Washington and assistant supervisor at Forty-eighth and Harrison. From the Forty-eighth and Harrison division Mr. Woodland was appointed supervisor of Twenty-ninth and Southwest Boulevard.

### OBITUARY

**James M. Denniston**, for many years general traveling salesman of the American Steel & Wire Company, died at his residence in the Chicago Athletic Association on Aug. 29. Mr. Denniston was born in Pittsburgh in 1866. He was well known in wire circles in Pittsburgh and elsewhere in the West.



## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

### RECENT INCORPORATIONS

\*Pinellas West Coast Railway, St. Petersburg, Fla.—Incorporated to acquire franchises, build, lease, own and operate railroads or street railways. Capital stock, \$10,000. Officers: H. C. Case, president; J. A. Mangold, vice-president, and C. E. Worrell, secretary and treasurer.

### FRANCHISES

Mobile, Ala.—The Mobile Light & Railroad Company has received a franchise from the Council to construct an extension to its Dauphin Street line.

Batavia, Ill.—The Aurora, Elgin & Chicago Railway has asked the Council for a renewal of its franchise in Batavia.

Kansas City, Mo.—The Kansas City Railways has received a franchise from the Council to construct a single-track line on Twenty-fifth Street from Troost to Grand Avenues.

Nashville, Tenn.—The Nashville Traction Company has asked the Board of Commissioners for permission to remove its tracks on Fifth Avenue from Deaderick Street to Church Street.

### TRACK AND ROADWAY

Los Angeles (Cal.) Railway.—The Los Angeles Railway and the City Engineer's Department will work out a program whereby 10 miles of work by the company will be finished before the rainy season, the most important being done first. This was decided on by the Board of Public Works when the company asked that it be allowed to reconstruct its tracks on Second Street between Spring Street and Broadway and on Figueroa Street between Seventh and Eleventh Streets before going ahead with work in other districts. Chief Engineer Bulpin of the Los Angeles Railway informed the Board that at present there are nearly 10 miles of track to be attended to in addition to 2 miles on Mesa Drive, just outside the city. He said the work was being pushed as rapidly as possible, and under the present schedule it was hoped to have it cleaned up before winter.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will construct an extension from La Habra to Anaheim, via Fullerton.

San Jose (Cal.) Railroads.—Work has been begun by this company reconstructing its tracks on Seventeenth Street from Santa Clara to Empire. The present 60-lb. Trilby rail will be replaced with 72-lb. T-rail.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—This company expects soon to begin construction on its proposed electric railway to connect Jacksonville and St. Augustine. T. R. Osmond, St. Augustine, general manager. [June 12, '15.]

Atlanta & Anderson Electric Railway, Atlanta, Ga.—The Atlanta & Anderson Construction Company, Electric and Gas Building, Atlanta, has been organized preliminary to constructing the proposed electric railway from Atlanta to Anderson, S. C. J. L. Murphy, Atlanta, is interested. [Sept. 2, '16.]

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—Work has been begun by this company on the construction of an extension north of its Seminary Street line.

Kewanee & Eastern Electric Railway, Kewanee, Ill.—Preliminary surveys are being made of this company's proposed line from Kewanee to Henry. C. G. Lampman, Cedar Rapids, is interested. [May 18, '16.]

Chillicothe & Peoria Electric Railway, Peoria, Ill.—This company will probably receive a free entrance to the city

of Peoria, if the decision of the streets committee of the Council is upheld. The committee regards the new inter-urban line merely a tenant of the Peoria Railway, as it will enter the city over tracks of the latter company. [Aug. 26, '16.]

Jacksonville Railway & Light Company, Peoria, Ill.—This company is repairing its tracks on South Main Street and the Vandalia Road.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company reports that within the next two months contracts will be placed for the construction of one block of track in Paxton to complete its line to its new station; also for switches and special work at Paxton.

St. Joseph Valley Railway, Elkhart, Ind.—It is reported that an extension will be built by this company early in 1917 to Toledo, Ohio.

Columbus, Greensburg & Richmond Railway, Indianapolis, Ind.—It is reported that the project to construct a line from Columbus to Richmond, via Greensburg and Connersville, has been submitted to a financing company. John A. Shafer, Indianapolis, consulting engineer. [April 8, '16.]

Bay State Street Railway, Boston, Mass.—Operation has been begun on the Highland Circuit line of the Bay State Street Railway. The extension forms a loop along Dock Avenue, Grant Street and Bay View Avenue, Lynn.

Boston (Mass.) Elevated Railway.—A general widening of the space between tracks and the laying of new rails in Brookline is planned by the Boston Elevated Railway during the coming year. Plans for the near future contemplate track changes on Washington Street from Park Street to Beacon Street; on Harvard Street from Coolidge Corner to the Allston line, and possibly from Boylston Street to Coolidge Corner. Work on Harvard Street is already under way, and will soon be started on the other sections where change is contemplated. The increased space between tracks when the work is completed will be 5 in., and the new rails will be of the heavy type of girder rail. The joints between rails will be electrically welded.

Iron River, Stambaugh & Crystal Falls Street Railway, Iron River, Mich.—This company, which operates a line from Iron River through Stambaugh and Palatka to Gaastra, reports that its line to New Caspian is partly finished and a line is projected to the James locations, 2 miles north of Iron River. Work on the company's main line to Crystal Falls which was begun in 1914 will be continued this year if it is possible to secure labor and the necessary material in time.

Public Service Railway, Newark, N. J.—It is reported that this company will construct tracks from the present terminus of its Cedar Lawn line at Market Street and the Wesel Road to the entrance of Cedar Lawn Cemetery.

Pennsgrove, N. J.—A committee composed of members of the Chambers of Commerce of Wilmington, Del., Pennsgrove, Woodstown, Elmer, Millville, Vineland and Atlantic City, N. J., is working on the project to build either a steam or electric line from Pennsgrove to Atlantic City, connecting all of the towns interested. It is estimated that a line taking in all of these points would cost \$5,000,000. Another plan is to connect only Pennsgrove and Elmer with a trolley line, giving Wilmington and Pennsgrove direct connection with Atlantic City and the other South Jersey points, via the Pennsylvania and Jersey Central Railroads. These two railroads seem willing to co-operate in the project, providing connection is made to their lines. [July 8, '16.]

Salem & Pennsgrove Traction Company, Salem, N. J.—This company reports that 4 miles of its line between Salem and Pennsgrove is completed and in operation and the balance will be completed this fall. The line when completed will be 14 miles long. Carl N. Martin, Philadelphia, secretary. [March 11, '16.]

Public Service Railway, Trenton, N. J.—County Engineer Logan has ordered the Public Service Railway to raise its tracks 5 1/3 in., to conform with the road between Bordentown and Trenton.

Southern Public Utilities Company, Charlotte, N. C.—This company is improving its track in Winston-Salem.



**Goldsboro (N. C.) Electric Railway.**—This company reports that it has just completed the construction of 1½ miles of new track.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—It is reported that this company plans to construct a new bridge at Walnut Street, West Barberton.

**Tulsa (Okla.) Interurban Railroad.**—Promoters of the Tulsa Interurban Railroad, which is to afford an entrance into Tulsa for the Iron Mountain and the Missouri, Oklahoma & Gulf Railways, announce that preliminary work will begin in a few days. A route via Broken Arrow has been selected and grading will be rushed. H. D. Pattee, Tulsa, is interested. [July 15, '16.]

**Guelph (Ont.) Radial Railway.**—A report from this company states that it expects to construct 3000 ft. of track in 1917.

**London (Ont.) Street Railway.**—This company will construct an extension to its Hamilton Road line and will double track its Dundas Street line.

**Sudbury-Copper Cliff Electric Railway, Sudbury, Ont.**—It is reported that this company is contemplating the construction of two extensions, one from the Sudbury flour mill, the eastern terminus of the line, to the Murray nickel mine, about 4 miles; the other to start from the Sudbury flour mill to the Mond Nickel Company's plant at Coniston, about 19 miles. J. H. Mackey, Sudbury, president.

**\*Portland & West Coast Railroad & Navigation Company, Newport, Ore.**—It is reported that construction will soon be begun by this company on a proposed electric railway between Newport and Portland. Dr. A. J. Fawcett, Newport, is interested.

**Portland Railway, Light & Power Company, Portland, Ore.**—This company has decided to run no electric cars across the big interstate bridge over the Columbia River to Vancouver, Wash. E. Howard, engineer of the company, states there is no money in such an arrangement for the company, as it would cost at least \$30,000 to build a line across the bridge to Vancouver. For that sum, the company claims, it can get enough big buses to care for the traffic.

**Saskatoon (Sask.) Municipal Railway.**—Proposals are under consideration by the City Council of Saskatoon for the construction of 1200 ft. of new double track on the provincial bridge at Twenty-fifth Street.

**Knoxville Railway & Light Company, Knoxville, Tenn.**—About \$175,000 is being spent this year by the Knoxville Railway & Light Company on improvements to its system in Knoxville. The company is reconstructing its Magnolia Avenue line and is improving its double track on the Broadway Pike from the city limits to Arlington. The Sevierville line has been rebuilt from the county bridge to the end of the line, about 1 mile. Of this distance, 2330 ft. is double tracked.

**Nashville & Eastern Electric Railway, Smithville, Tenn.**—In an election held recently DeKalb County voted to issue \$150,000 4 per cent, thirty-year bonds and subscribe that amount to the stock of the Nashville & Eastern Electric Railway. The line will extend from Nashville to Smithville, via Lebanon, Watertown, Alexandria and Liberty. A year ago DeKalb County voted \$150,000 4 per cent bonds for the purpose of building an electric line from Lebanon to Smithville, but on account of technicalities the bonds were held void. Construction work will begin at once on the road as the survey has been made and most of the right-of-way has been secured. The road will connect with the Nashville, Chattanooga & St. Louis Railway at Lebanon, which, it is said, will be electrified from there to Nashville. The road is contracted to be finished by December, 1917. [Aug. 5, '16.]

**Dallas Consolidated Street Railway, Dallas, Tex.**—The City Commission of Dallas has granted an extension of time until Dec. 1 to the Dallas Consolidated Street Railway Company in which to begin track construction work ordered by the commission on Texas Street, between Swiss and Live Oak Streets, and on Colonial Avenue between Lenway and Romaine Streets.

**Dallas Northwestern Traction Company, Dallas, Tex.**—E. P. Turner, president, and S. G. Perkins, chief engineer, of the Dallas Northwestern Traction Company, have been

over the route of the proposed interurban line from Dallas to Denton, conferring with business men of the cities and towns which this line will touch. The officials also have investigated the proposed extension of the line from Denton to Gainesville, and have made favorable report on the project, after conferring with business interests at Gainesville. This line now is practically assured. [June 1, '16.]

**Galveston (Tex.) Electric Company.**—This company reports that it expects to construct ½ mile of track with concrete foundation and various special work layouts.

**Richmond, Rappahannock & Northern Railway, Richmond, Va.**—It is reported that nearly all the money needed to insure the construction of this company's line from West Point to Urbanna, 17 miles, has been subscribed, and it is expected that construction will be begun at once. C. L. Ruffin, 514 American National Bank Building, Richmond, chief engineer. [Dec. 11, '15.]

**Monongahela Valley Traction Company, Fairmont, W. Va.**—Surveys have been completed by this company for the extension of its Weston line through Stealey Heights Street.

## SHOPS AND BUILDINGS

**United Railways & Electric Company, Baltimore, Md.**—Plans have been filed by the United Railways & Electric Company for the construction of a one-story brick waiting station at Callow Avenue. The station proper will measure 20 ft. x 30 ft., while the shed will be 90 ft. x 30 ft.

**Kansas City (Mo.) Railways.**—This company has awarded a contract to E. L. Winn Construction Company, Kansas City, for the construction of a shelter house at Union Station. The structure will be 22 ft. x 60 ft., of cut stone with red tile roof. The floors will be of stone and brick. The cost is estimated at \$4,000.

**Goldsboro (N. C.) Electric Railway.**—This company advises that contracts will be placed at once for the construction of an addition to its carhouse.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—A freight depot is being built by this company beside the express station of the Electric Package Company at East Ninth Street and Eagle Avenue, Cleveland.

**Lake Erie & Northern Railway, Brantford, Ont.**—The Brantford City Council has granted a permit for the erection of a brick station on Colburn Street, to be used jointly by the Lake Erie & Northern Railway and the Brantford & Hamilton Railway. The work of putting in the foundations is being done by Schultz Brothers, Ltd., Brantford. The cost of the station is estimated at \$25,000.

**Valley Railways, Lemoyne, Pa.**—It is reported that this company will construct a new waiting station and office building at Second and Walnut Streets, Harrisburg.

**Dallas, Tex.**—The new \$1,500,000 interurban terminal at Dallas was opened for service Sept. 1. It was built by the Dallas Terminal Association. Cars of the Northern Texas Traction Company, the Texas Traction Company, the Southern Traction Company and any other lines which may be built out of Dallas will use the new terminal.

## POWER HOUSES AND SUBSTATIONS

**Pacific Electric Railway, Los Angeles, Cal.**—The hydro-electric plant of the Pacific Electric Railway at Upland was recently destroyed by fire, causing a loss of about \$20,000.

**Union Traction Company of Indiana, Anderson, Ind.**—This company has ordered twenty complete quadruple equipments with No. 333-V motors and HL control from the Westinghouse Electric & Manufacturing Company to replace some of their high speed passenger equipments consisting of 50-C motors and type L hand control.

**Des Moines (Iowa) City Railway.**—This company is asking for bids for the reconstruction of its power station. The equipment will include one 1000-kw. and one 5000-kw. generator unit.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—This company reports that it has awarded a contract to the Edge Moor Iron Company, Edge Moor, Del., for one 500-hp. boiler, to be installed and ready for service by Nov. 1. An extension to the company's plant to take care of this new equipment is now under construction by the Armstrong Engineering Company, Taylorville, Ill.



## Manufactures and Supplies

### SHEET METAL CULVERT TRADE SITUATION

Since the beginning of the European war the demand for sheet metal culverts has been rather less in amount than that in normal times. Prices have increased and decreased in accordance with the galvanized metal market, and the range of prices has varied from 5 to 15 per cent above the prices for corrugated culverts established in normal years. The selling conditions are thought to have been influenced not so much by the variations in culvert prices as by the generally slackened new construction work. Substantial quantities of metal culverts, however, were purchased for maintenance work. The low relative cost of this type of culvert is also responsible, probably in considerable part for the continued activity which has been experienced in the culvert market during the last year. These culverts are easier to transport and install than the materials used for the heavier types of drainage structures, and the increased prices that have been asked for cement, reinforcing steel and cast-iron pipe, together with the high cost of labor since July, 1914, have greatly improved competitive conditions so far as corrugated iron culvert sales are concerned.

The largest manufacturers of metal culverts state that the longer that installations of corrugated culverts are in service the clearer becomes the necessity for the use of high grade metal in them. The adaptability of corrugated culverts in heavier than standard gages for those situations where, on account of unstable foundations or other severe conditions it is difficult to maintain a permanent waterway, is likewise becoming more and more firmly established.

### PRICES AND DELIVERIES FOR TWIN STEEL TIES

Prices of steel products have varied so greatly in the last few months that observations on the steel tie situation are now of interest. Steel ties for city track work have been installed by a large number of city properties and also on some interurban lines.

One manufacturer, the International Steel Tie Company, Cleveland, Ohio, states that its twin ties have been used for the construction of more than 450 miles of city track in paved streets.

The first installation of this type of tie was made in 1909 on the Altoona & Logan Valley Electric Railway at Altoona, Pa., the second was made by the Cleveland Railway in 1910, and the third was made early in 1911 by the Scioto Valley Traction Company at Circleville, Ohio. Since that time their use has spread. Now they are used by nearly 100 different electric railways located in all sections of the United States.

The cost of the steel itself is said to account for more than half the selling price of twin steel ties, the present price of which is \$4.90 per tie. One tie, however, is sufficient for each 6 ft. of track. In times of normal steel prices these ties sold for \$3.50 each, f. o. b. Cleveland. Then steel was about \$1.10 and now it is \$3 per 100 lb. The price of malleable iron rail clips, eight of which are required per tie, is 5 cents each. Thus the total price of ties and clips per mile of track is about \$4,665. The manufacturers point out that a reduction in the quantity of excavation and concrete needed brings about a sufficient lessening in the total cost of the track foundation to enable these steel ties to compete with wood ties on the basis of first cost of paved track substructure, even at the present high cost of raw steel.

The manufacturer also states that his contracts with steel producers provide sufficient steel for the manufacture of about 300,000 more ties than are now on order and that deliveries can be made immediately in carload lots of 300 to 500 ties so that they may be used for fall construction work. Recent rush orders for Fargo, N. D., Tippecanoe City, Ohio, and Beaumont, Tex., were shipped within four days from receipt of order.

### OUTDOOR TRANSFORMER AND SWITCHING STATIONS

Continued development of the sale of power direct from the transmission lines of interurban railways has greatly increased the sales of the manufacturers of outdoor transformer and open-air switching stations. The interurban lines of the North Central states have installed a great many open-air switching stations for tapping their high-tension railway transmission system so that local consumers, such as industrial plants and small municipalities, may be fed direct from the railway circuits. These open-air stations consist of towers carrying horn-gap switches that are operated from a lower level through the medium of connecting rods. One refinement in this general type of switch as produced by the Railway & Industrial Engineering Company of Pittsburgh is that of the automatic air-break switch equipped with overload trips and no-voltage release. A further refinement which has been lately supplied to some railways is that of remote electrical control for opening or closing the air-break switches. One use for switches so equipped is for sectionalizing branch lines.

This company is making three weeks' delivery on its standard type of outdoor substations and six weeks' delivery on special equipment. Some of the more recently designed special equipments include outdoor switching stations for handling 110,000-volt energy supplied to portable transformer stations of the Southern Power Company.

### MOTOR TRUCK SALES ACTIVE

Reports from the manufacturers of motor trucks indicate that the sale of gasoline power wagons has been especially active this summer. The White Company of Cleveland, for example, cites the sale during six weeks of more than 100 motor trucks to be distributed among thirty-nine public service companies. This company has a department devoted to the design of special truck and body equipment suitable for electric railway operating and constructing uses, as well as for other public utility uses.

Examples of economy to be obtained from the use of motor trucks, particularly for line and emergency outfits, have prompted engineers carefully to study the possibilities in the electric railway field and to apply the trucks in many new and interesting ways. The results of these investigations are reflected in orders for specially designed motor equipment to meet individual requirements of different properties.

The types of gasoline motor equipment used by public service corporations include line repair trucks, emergency trucks, cable pulling power-winch trucks, power trucks, wrecking trucks, ash removal trucks equipped with power dumping bodies, delivery trucks, and in some instances electric railways use buses for providing branch feeder line passenger service.

Recent orders have been placed with the White Company for motor trucks to be delivered to the Public Service Corporation of New Jersey; the Panama Traction Company, a new organization at Jamestown, N. Y.; New York State Railways; Des Moines City Railway; Columbus, Delaware & Marion Railway; Charleston Consolidated Railway & Lighting Company; Yonkers Railroad Company; Republic Railway & Light Company, Youngstown, Ohio; Stone & Webster Management Association; Chicago Surface Lines; Georgia Railway & Power Company, and the Grand Rapids (Mich.) Railway.

### SALES OF EXPANDED STEEL POLES

A new use for the expanded steel pole is reported by A. J. Bates of the Bates Expanded Steel Truss Company, Chicago. These steel trolley type poles are being employed for supporting outdoor high-tension switching and lightning arrester stations. The Central Maine Power Company has a large wire tower built of these poles and the Delta-Star Electric Company has purchased poles for five outdoor substations.

This type of pole has been on the market less than a year and consequently many of the orders received have called for poles for demonstration purposes. Repeat orders are



now reported. The largest number of Bates poles so far sold to an electric railway went to Des Moines, where the Des Moines City Railway is completing the erection of more than 1100 expanded steel truss trolley poles. Other orders have been delivered to the Chicago, Ottawa & Peoria division of the Illinois Traction System, the Aurora, Elgin & Chicago Railroad, Chicago & Joliet Electric Railway, Hudson Valley Railway, Public Service Company of Oklahoma, Oklahoma City Railway, Intermountain Railway, Light & Power Company, Lamar, Col., and to a substantial number of central stations and transmission companies in various parts of the country. Several foreign orders have been delivered, and recently a repeat order was received from a property in Cuba. The manufacturing capacity of the plant has reached 300 poles a day; deliveries on standard trolley poles can be made at once, and 70-ft. combination poles can be shipped in ten days. The price of poles advanced somewhat in July, but the officers of the company state that their reserve of steel is such that they can now furnish steel poles at a price but little above the present price of raw steel.

#### WIRE AND CABLE ORDERS LARGE

Manufacturing conditions in the weatherproof wire and cable industry have improved greatly during the last few months. The Standard Underground Cable Company, for example, has five plants now all in full operation. Delivery on weatherproof trolley feeder cable and wire is normal at two months, but the manufacturers point out that such roads as may be planning for the installation of weatherproof feeders and cable in the early months of next year should consider ordering very shortly. The biggest buyers of cable are now placing contracts for exceptionally large amounts. They are placing orders far in advance, and this may embarrass the manufacturers in making normally prompt deliveries of smaller orders.

#### ROLLING STOCK

**Goldsboro (N. C.) Electric Railway** is in the market for two open cars and one closed car.

**Jackson Railway & Light Company, Jackson, Tenn.,** is in the market for two one-man car bodies.

**Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.,** has ordered two cars from the Southern Car Company.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio,** is in the market for ten additional cars for city service.

**Charleston (W. Va.) Interurban Railroad** is reported to have placed an order with the Cincinnati Car Company for two all-steel double-truck interurban cars.

**North Jersey Rapid Transit Company, Hohokus, N. J.,** is reported to be contemplating the purchase of one-man light weight cars to replace present equipment.

**Long Island Railroad, New York, N. Y.,** is inquiring for prices on forty-five trail cars for use on its electrified divisions and for fifteen coaches and ten baggage cars for steam operation.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.,** noted in the *ELECTRIC RAILWAY JOURNAL* of March 18 as considering the purchase of twenty-five all-steel double-truck cars, has ordered this equipment from the Cincinnati Car Company.

**Wheeling (W. Va.) Traction Company** is in the market for fourteen double-truck city cars. This new requirement is in addition to the eight 30-ft. body double-truck cars which have just been delivered by the Cincinnati Car Company. The latter cars are equipped with four Westinghouse motors and with Allis-Chalmers air-brake equipment.

**Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.,** noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12 as considering the purchase of additional equipment, is in the market for five interurban motor cars. This company has just received from the Westinghouse Electric & Manufacturing Company two new single-phase freight locomotives weighing 72 tons each.

#### TRADE NOTES

**Miller Trolley Shoe Company, Boston, Mass.,** has received an order for forty-eight trolley shoes from the Lehigh Valley Transit Company.

**Railway Improvement Company, New York, N. Y.,** has received an order for anti-climbers for the fifty cars recently ordered from The J. G. Brill Company by the Boston Elevated Railway.

**Consolidated Car Fender Company, Providence, R. I.,** has received, through its general sales agent, Wendell & MacDuffie Company, an order from the Wheeling Traction Company for fifty H-B life guard equipments.

**Page Woven Wire Fence Company, Monessen, Pa.,** has appointed W. T. Kyle as Eastern sales manager, with offices at 30 Church Street, New York. For some time Mr. Kyle has been connected with the Okonite Company in the sales department and previously was Eastern sales manager of the Duplex Metals Company.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.,** has received an order from the Jackson Light & Traction Company for two equipments of Westinghouse 515-X motors and five equipments of Westinghouse 512-Z motors; the first mentioned to be used in two new light-weight one-man cars now being built and the last to be used in replacing old-type motors.

**Peter Smith Heater Company, Detroit, Mich.,** reports the recent receipt of the following orders for heaters of the forced-ventilation type: Wichita Railway & Light Company, seven; Kansas City, Kaw Valley & Western Railway, four; Ashtabula Rapid Transit Company, three. This company has also received an order from the St. Joseph Valley Traction Company for two hot-water car heaters.

**National Tube Company, Pittsburgh, Pa.,** has announced that a new steel pipe mill will be built at once at Gary, Ind. The plant will be located near the works of the Indiana Steel Company and will make pipe from the ore to the finished product. It is pointed out that so far as electric railways are concerned this new plant will place the company in a much better position for the delivery of steel trolley poles and power plant steam piping.

**Cleveland (Ohio) Fare Box Company** has recently made the following sales of its locked fare boxes: Fifty for the Clement C. Smith Companies at Winona, Minn.; Green Bay, Wis., and Evanston, Ill.; 265 to the Pittsburgh Railways, sixty to the New York State Railways, fifteen to the Buffalo & Lake Erie Traction Company, and fifty to Detroit United Railway, to which company an order for eighty boxes has just been delivered. That the fare box business is particularly active is evident by the statement that the Cleveland Fare Box Company has now unfilled orders on its books for more locked boxes than it sold during the entire year of 1915.

#### ADVERTISING LITERATURE

**Ohmer Fare Register Company, Dayton, Ohio,** has issued a booklet on the Ohmer system, entitled "Power."

**Searchlight Company, Chicago, Ill.,** has issued Catalog No. 12 on Searchlight welding and cutting equipments. This company is also distributing a circular illustrating its equipment and some of the work done by it.

**White Company, Cleveland, Ohio,** has circulated several new bulletins on the service now being rendered by White motor trucks in use in the electric railway industry and also in other divisions of the public utility fields. Illustrations in these bulletins show special types of bodies designed for line and track work. One bulletin is devoted to tower trucks for electric railway service.

The paint and varnish manufacturers report a considerable increase in electric railway business for 1916 as compared with former years. The Sherwin-Williams Company, Cleveland, Ohio, has done over 25 per cent more electric railway business during the year ending Aug. 31 than it did in the previous year. This company, due to war conditions, has built a dye manufacturing plant and is at present turning out daily a ton of red dye. The dye-making equipment is soon to be doubled in capacity.





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"And that's a long time," say the Irish.

Well, we're not quite so old as that, but we've been supplying the electric railway industry with Peacock Brakes ever since said industry was a boy.

Peacock Brakes have been improved or adapted from time to time just as the industry which it serves has grown or changed its ways.

For example, when 33-in. wheels were the rule, the liberal under-floor clearances then in vogue imposed few limitations upon the dimensions of the braking mechanism.

But coincident with the introduction of the low-floor car with pony-size wheels, we made modifications in size, shape and weight that have met with the hearty approval of all purchasers.

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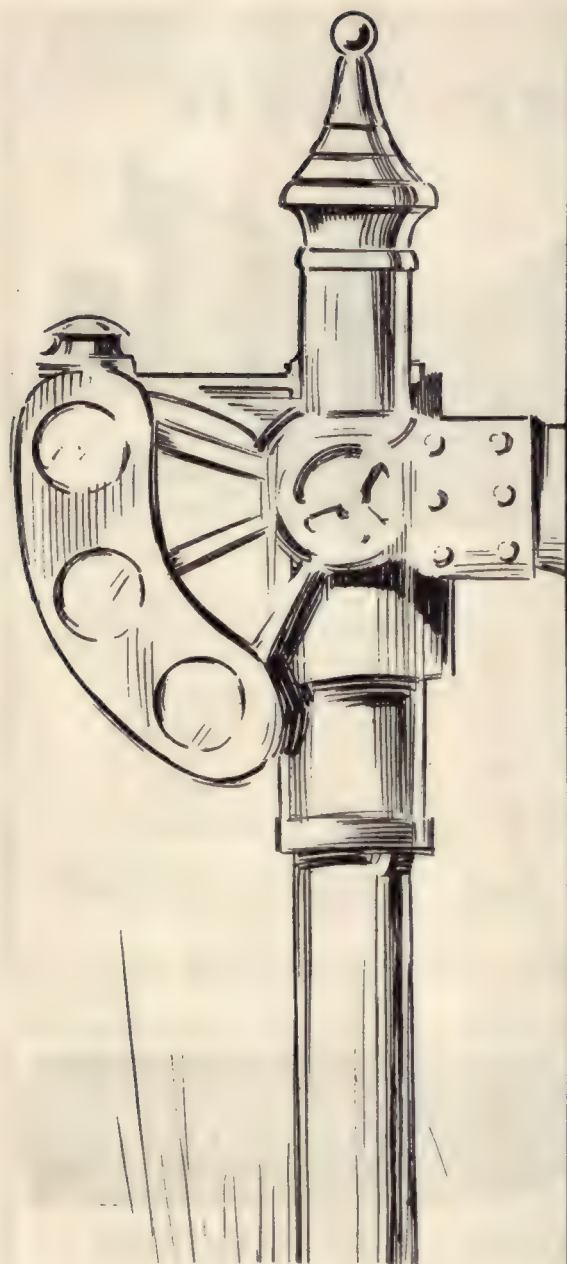
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—that is if you are at all interested  
in continuity of signal service  
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		No. 205
New York, <u>Sept. 23</u> 1916		
Permission is hereby requested by the <u>Rackway Railway Co</u>		
Company, under franchise of <u>June 8, 1893</u>		
to open (state location) <u>Fifth St bet. Jones and</u>		
<u>Miller Ave.</u>		
for purpose of <u>re-welding broken joints</u>		
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<small>Subject to the City Ordinances and Rules and Regulations of the Bureau of Highways (see other side), which are hereby agreed to</small> TIME LIMIT <u>30 Days</u>		
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- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



# All the Facts

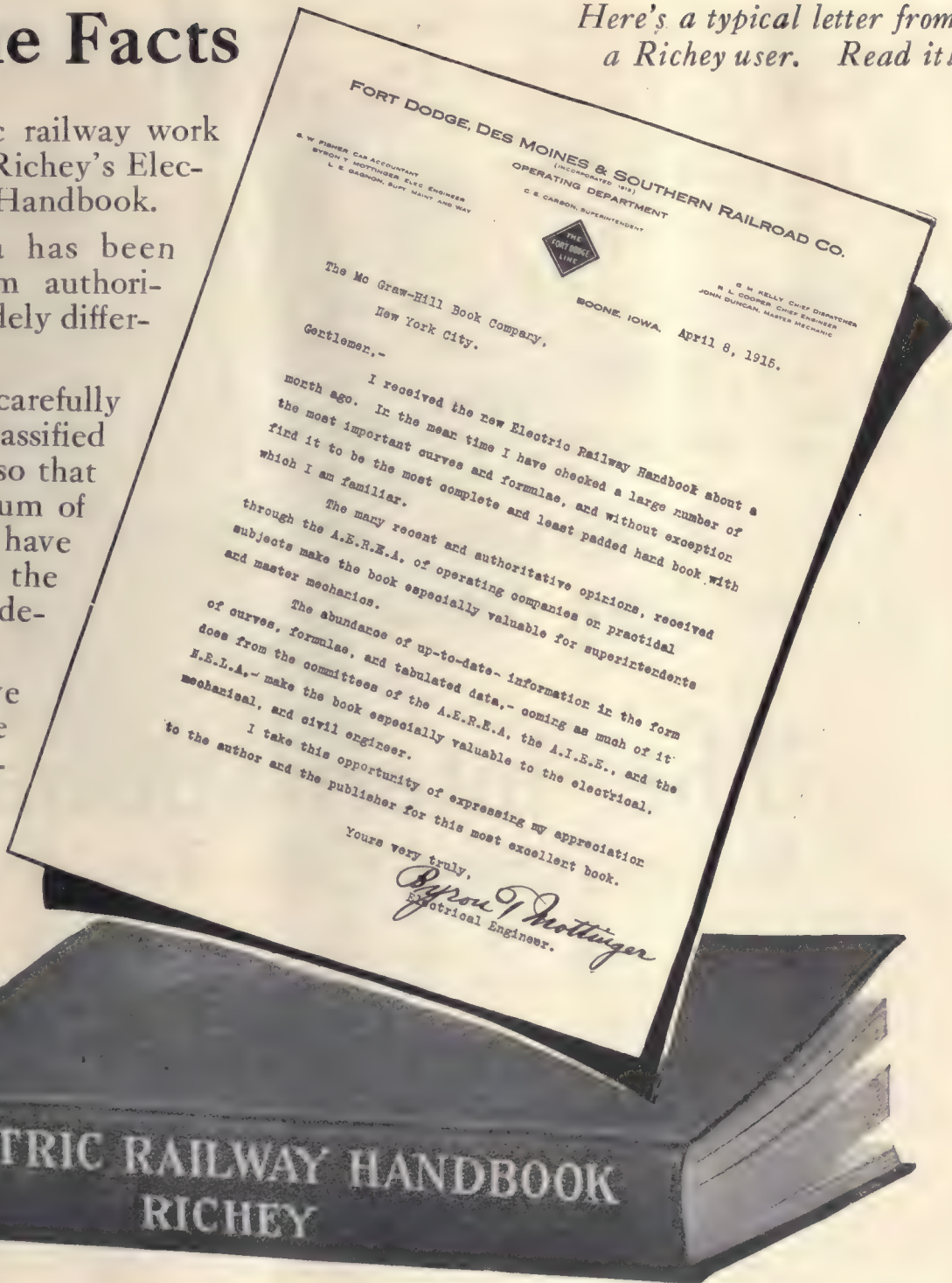
about electric railway work are given in Richey's Electric Railway Handbook.

The Data has been gathered from authoritative and widely different sources.

It has been carefully digested, classified and indexed so that with a minimum of effort you can have available just the material you desire.

We believe you will agree with Mr. Mottlinger after examining a copy. Merely sign and mail the coupon.

Here's a typical letter from a Richey user. Read it!



By Albert S. Richey, Electric Railway Engineer, Professor Electric Railway Engineering, Worcester Polytechnic Institute. 830 pages, over 600 illustrations; leather, pocket size, full gilt, \$4.00 (English price, 17s), net postpaid.

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If You Asked the  
Traffic Man About

## The International Motor-Driven Coin Register

"Cars cost a lot of money these days, so the quicker we can loop 'em around the better.

"We'd done a lot by putting in lower steps and air-operated doors to speed things up, but there was still a hitch at the fare collection end.

"We were insisting that every fare be registered as collected. Well, it simply couldn't be done without blocking the line like a bust-up coal truck.

"Finally, we came to the Boston style—the International Coin Register.

"Say, the way the people file past that combination is an eye-opener. The conductor never raises his arm except to register a transfer. The machine does the one-by-one registering for him, so there's one less rule to violate, and the closing of the doors in a jiffy is a reality.

"Every little helps, they say—but it's more than a little help—this ***International Motor-Driven Coin Register.***"

**THE INTERNATIONAL REGISTER COMPANY**

15 South Throop Street, Chicago, Ill.

Manufacturers of Coin Registers, Fare Boxes, Double and Single Car Registers and Fittings,  
Conductors' Punches, and exclusive agents for Heeren Enamel Badges.





## Forecasting Hess-Bright Savings

These time-speed graphs with plain and anti-friction bearings respectively were drawn by the New York State Railways—Rochester Lines—as a forecast of what Hess-Bright journal ball bearings might do on car 721.

The area of the power graph for plain bearings was 2.142 sq. in.

The area of the power graph for Hess-Bright bearings was 1.822 sq. in.

The indicated power saving was 14.9 per cent.

The actual test showed a saving of 14.1 per cent—a pretty close approximation to theory.

And a substantial saving.



*Hess-Bright Ball Bearings  
have proved their longevity*

# THE HESS-BRIGHT MANUFACTURING COMPANY

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NEW  
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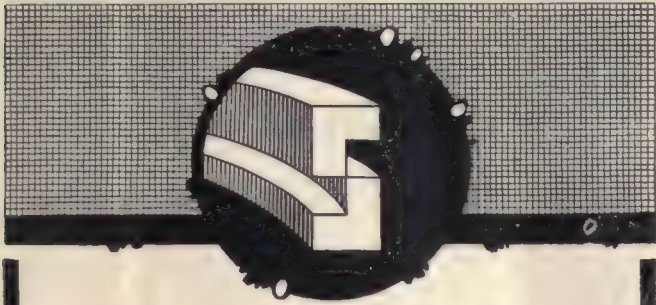
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## You Can't Afford Cheap Piston Rings

Putting cheap piston rings in your air compressors is the poorest form of economy. The small initial saving is lost many times over in weak compression and scored cylinders.

The Piston Rings that invariably prove cheapest in the end are the Genuine McQuay-Norris **LEAK-PROOF** Piston Rings, because for the **LEAK-PROOF** price you get the strongest and most durable piston ring made—plus good, strong compression, maximum service and minimum cylinder repairs.

**BE CAREFUL.** When you order **LEAK-PROOF** Rings, be sure you get them. Look for the name **LEAK-PROOF** stamped on every ring. Insist on seeing it. Examine the rims; make sure it is made of two sections equal in size, fitting round one another angle to angle. That's the exclusive **LEAK-PROOF** design—vitally necessary to true **LEAK-PROOF** service.

A set of rings FREE, for any air-compressor test.

Manufactured by

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"Ask the User"



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**MCQUAY-NORRIS**  
**LEAK-PROOF**  
**PISTON RINGS**  
-the Genuine

## When there's no room to pump as you use

look for the most awkward corner, the most inaccessible point around the plant, and ask yourself—"If a fire started there would I have room enough to work an extinguisher?"

With the J-M Extinguisher you can do all the pumping where there is elbow room, then go into the tightest corner and with the air pressure thus stored up, shoot a steady stream into the fire. Or where room permits, you can pump and aim at the same time. The J-M is the only extinguisher that gives you this choice of operation.

Effective against any incipient fire, including oil, grease, gasoline and electric arc.

Inspected, tested and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

The J-M Extinguisher Fluid for recharging is sold in quart cans bearing the J-M trademark. This liquid is non-deteriorating and a non-conductor. Obtainable from all dealers who handle this extinguisher.



\$3.00  
Brass or  
Nickel  
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Bracket  
included



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# Physical Examination for Employees

BY FRANCIS D. PATTERSON, M.D.

Chief Division of Industrial Hygiene and Engineering, Department of Labor and Industry, Harrisburg, Pa.

Inefficiency due to poor health is a burden distributed upon many shoulders. The corporation which has physically substandard employees suffers from decreased quantity and often quality of work performed. The commonwealth bears its share, for often the man or woman becomes the recipient of medical care in a hospital which is at least partially supported by state funds. Finally, the illness may be such as to cause the unfortunate to lose time, and his loss of wages falls as a heavy burden upon those dependent upon his or her earnings.

It is the subject of available information from German statistics that losses of earnings due to illness of workers in America, the sum of the total loss in 1914 alone amounted to more than \$360,000,000 each year, and this takes no account of the losses in profits to the employer by reason of a slowing up of his output or of the loss to the state at large owing to a premature old age, the result of disease.

## WORK OF TRACTION PHYSICIAN

If the physician is to assume the place in the industrial life of this country for which his training fits him, he should be the guide, philosopher and friend of employer and employee, maintaining a health supervision over the industry and its employees which will increase efficiency and profits. The competent physician is a real dividend-maker for every corporation.

In the case of a traction company the general work of the physician should be as follows:

He should emphasize to the management the value of proper lighting as a means of increasing efficiency and preventing accidents to the employees, to the passengers and to the public at large.

He should suggest that car cleaning may be efficiently, cheaply and healthily performed by vacuum cleaning or other dustless methods.

He should indicate how rest rooms, with sanitary toilet facilities, individual wash basins, shower baths and cool pure water increase efficiency and decrease accident. He should emphasize to the management that their duties with the utmost efficiency it is necessary that their hours of work be followed by mental and physical relaxation. He should suggest, when indicated, that motormen be given protective glasses to decrease the glare or reflection of light from the intensely harmful infra-red and ultra-violet rays from the arc of the trolley wire. He should suggest that the use of the vacuum cleaner for car cleaning be made for car cleaning.

He should actively assist the management in the education of the employees for the prevention of accidents and the conservation of the health of all employees.

He should promptly render competent first aid and make the necessary referrals to the proper medical cases that occur.

He should prescribe proper medical treatment for the acute or chronic illnesses of all employees, thereby

# The On-Time Advertiser

who gets his copy and cuts to us well before the day his advertisement should go to press, gets better type composition, better location and a better opportunity to make necessary corrections on the proofs, which can then be submitted before publication.

# The Last-Hour Advertiser

whose copy and cuts come in at the last minute or even later, gets the best attention we can possibly give him. We work overtime to do what we can for him. But the lack of sufficient time makes it physically impossible to do as well for him as for the advertiser whose instructions come in well before the last hour.

# Get Your Copy and Cuts in Early

Do this, not on our account, but for the sake of your own advertising. We want to serve all advertisers equally well—but we can't put more hours into a day, and the advertiser who gives us the most time gets the best results.

Copy and cuts should be in our hands by Thursday of the week preceding the date of issue. This means that Thursday is the last day on which copy can be handled normally.

After that we cannot promise proofs, and we cannot insure classification.

For good advertising, get your cuts and copy in every week before Thursday.

Electric Railway Journal  
239 West 39th Street, New York

## Western Electric Company

INCORPORATED

New York	Atlanta	Chicago	Kansas City	San Francisco
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			Denver	Salt Lake City

EQUIPMENT FOR EVERY ELECTRICAL NEED

Member Society for Electrical Development. "Do it Electrically"



# ALL The Heat Is Available

for warming the car, if you use the

## Consolidated Panel Heater

The Heater that Set the Pace for Others



The patented circulating air-space at the back allows a constant stream of heated air to pass out into the car. Besides affording maximum circulating efficiency, this patented construction assures long life by keeping all parts at normal temperature.

Though of very light weight, the Consoli-

dated Panel Heater is very strong—front, back and ends are all of rigid pressed steel. A junction box is provided at each end, affording clamping facilities when wires are carried in conduit. Write for Bulletin 4, and remember that 70,000 out of 90,000 cars in the U. S. are warmed by Consolidated Heaters.

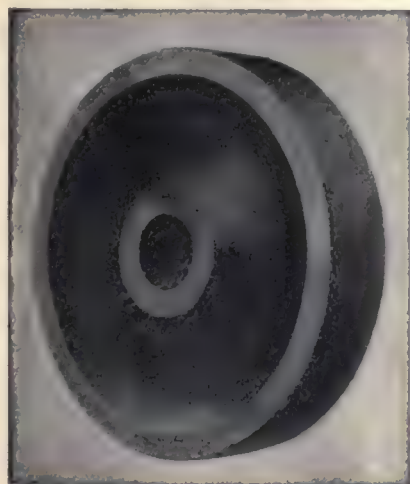
## Consolidated Car Heating Company

New York  
Singer Building

Albany, N. Y.

Chicago  
Fisher Building

### Steel for Service



Gear Blank

Your aim is to procure as perfect a car as can be built.

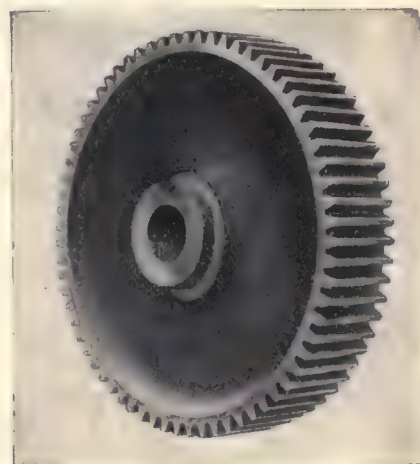
You therefore try to make sure that it embodies not even one weak feature.

Unless your cars are equipped with the very best obtainable gears they are not perfect.

### Gears Cut from Carnegie Rolled Steel Gear Blanks

will make that detail of your cars as high class as any other part possibly can be.

Include them in your next specification.



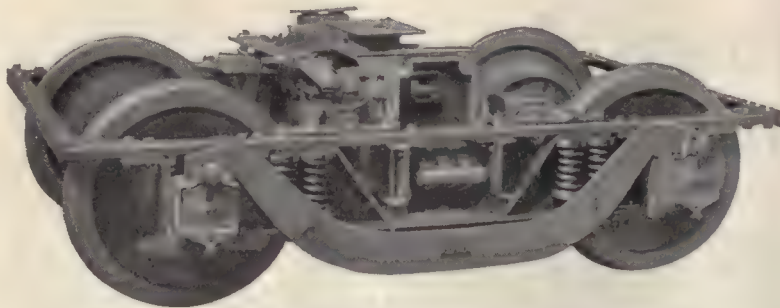
Finished Gear

## Carnegie Steel Company

General Offices: Pittsburgh, Pa.



# THE INTERURBAN ELECTRIC



Class Truck built for Dayton & Troy Electric Ry. Co.

Wheel Base 84 inches. Carrying capacity  
on center plate, 30000 lbs.  
84—30—AA

strength without superfluous weight. Materials and workmanship are in keeping with the service requirements. Further particulars will be furnished on request.

vies with the steam road in furnishing high-class service. Its construction is modern throughout; the rolling stock is heavy, and high speeds are maintained. First class truck equipment is a primary essential to success under such operating conditions.

The Baldwin Class AA truck is specially designed for high speed electric railway work, and is successfully carrying heavy loads at speeds exceeding 60 miles per hour. It is of ample

## THE BALDWIN LOCOMOTIVE WORKS

Philadelphia, Pa.

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A. Wm. Hinger, 722 Spalding Building, Portland, Ore.  
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J. A. Hanna, Niles, Ohio.

## Wheeling Traction Company Wheeling, West Virginia

Specify

## H. B. LIFE GUARDS

for their

## Eight New Cars

## The Consolidated Car Fender Co.


Providence, R. I.

General Sales Agents

## Wendell & MacDuffie Co.

61 Broadway, N. Y.






The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

**STANDARD  
STEEL WORKS CO.**  
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Pittsburgh	Melbourne, Aust.
San Francisco	Monterey, Mex.
Richmond	Mexico City

**Standard Steel Works Co.**  
Morris Building, Philadelphia, Pa.





One of fifteen new  
**Jewett Steel Cars**  
Ordered by the Northern Ohio Traction & Light Co.

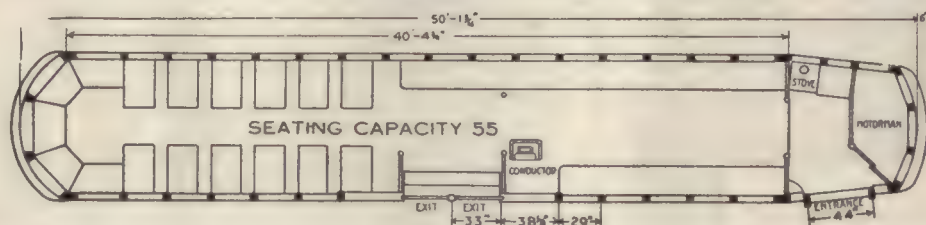
Seven of them have baggage compartments—eight have smoking compartments. All have spacious white enameled saloons with running water, etc. Pressed steel posts—steel plates throughout—steel grained mahogany interior finish—chanarch and composition flooring with battleship linoleum in aisles—these are some of the details of these “cars of character.”

*Let us bid on your specifications.*

**THE JEWETT CAR CO., Newark, Ohio**



# The Car Rider's Car



**I**N these days with steel-framed center-entrance cars isn't the placing of the conductor close to the entrance of a prepayment car both illogical and unnecessary? If the position of the conductor close to the entrance hinders passengers from getting quickly into the car and results in holding up the car and slowing up the schedule—every railway operator knows this to be the case—the logical thing to do is to move the conductor back far enough to stop the hindrance. And it is entirely practicable

to move the conductor back, providing there is a center exit under his control and a means of separating the passengers into two groups, those of one group to pay their fares as they pass the conductor and go to the rear section and those of the other group to pay as they leave the car. This is the logical, practical scheme of "The Car Rider's Car," and the results are the most remarkable in modern city railway operation.

**PETER WITT, 630 Leader Building, CLEVELAND**

## Promptness

*When you order electrical material—equipment—you want it—and want it quick*

*That's why many buyers prefer Union Service—they know that the goods will be there on time—that 90% of all orders are shipped the same day they are received.*



**Union Electric Company**

*Electrical Headquarters*

*Terminal Warehouses*

*Pittsburgh, Pa.*

**This man**

**received an increase of  
30 per cent. in his salary**

—because he had the business judgment to announce this want in the Searchlight of Electric Railway Journal.

POSITION wanted by young man with 7 years' experience as armature winder and controller man. Best of references. Box Elec. Ry. Jour.

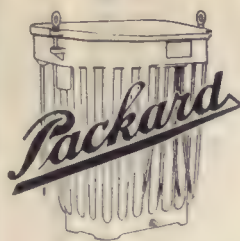
**He writes:**

"The result from my advertisement in the Electric Railway Journal was wonderful. I received 8 replies and accepted a new position with more than 30 per cent increase in salary."

**His Ad. ran four times, at a cost of \$2  
Was it worth it?**

*Put your Wants in the Searchlight*





## Transformers

A good as 25 years of specialized transformer experience can make them with the best materials it is possible to manufacture.

Write for Bulletin E.R.J. It's a transformer text book.

*The Packard*  
**Electric Company**  
WARREN, OHIO, U. S. A.

## STEEL POLES



Bates Steel Poles in use by the  
DES MOINES CITY RAILWAY  
DES MOINES, IOWA, U.S.A.

Best steel pole in the world for electric railway trolley service, **STRONGEST, LIGHTEST, MOST ARTISTIC, LOWEST IN PRICE, QUICKEST DELIVERIES.**

A full line of convenient Malleable Fittings  
Our Steel Pole TREATISE tells a big story—Ask for it.  
We make steel poles for every pole purpose.

**BATES EXPANDED STEEL TRUSS CO.**  
208 SOUTH LA SALLE STREET  
CHICAGO, ILL., U. S. A.



Nachod Bell on Nashville Interurban Railway

**Nachod Signal Co., Inc.**  
4777 Louisville Avenue  
LOUISVILLE, KY.



## A Splice that Heat Can't Hurt

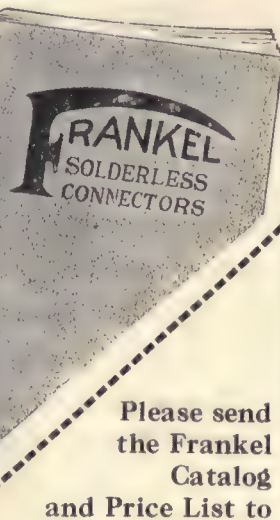
Overloads that would heat soldered cable splices to the melting point can't hurt a splice made with Frankel Solderless connectors.

Booklet on request.

MAKERS OF THE BEST ONLY  
**FRANKEL**  
CONNECTOR CO. INC. N.Y.

Factory:  
177-179 Hudson St.,  
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Sales Rooms:  
733-735 Broadway



Please send  
the Frankel  
Catalog  
and Price List to

Name.....

Address.....



## THE LINDSLEY BROTHERS CO.

### Western "Good Poles Quick" Northern

Quick Shipments  
from our  
Minneapolis Yard

Rooms 832-834, 72 West Adams St., Chicago, Ill.  
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"Hot and Cold" Processes

# TREATED

POLES, CROSS ARMS, TIES,  
TIMBERS, PAVING BLOCKS.

CAPACITY 100,000,000 FEET B. M. PER ANNUM  
SEND FOR PAMPHLET

INTERNATIONAL CREOSOTING & CONSTRUCTION CO.  
Address all communications to Office, Galveston, Texas  
Works: Beaumont, Texas Texarkana, Texas

It Meets Every Requirement—The Celebrated


## Trenton Trolley Wagon

J. R. McCARDELL & CO.

Patentees and Sole Manufacturers

Correspondence Solicited.

TRENTON, N. J.

*Barrett's*   
Grade One  
LIQUID  
**Creosote Oil**

CUTS WOOD  
PRESERVING BILLS  
IN HALF

Write for booklet

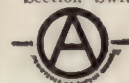
The *Barrett* Company  
NEW YORK  
Branches in Principal Cities

AETNA INSULATION LINE MATERIAL  
Third Rail Insulators, Trolley Bases, Poles, Harps and Wheels,  
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Section Switches.

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Established 1877.

Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.  
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## Chapman

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Charles N. Wood Co., Boston



Prolong the Life of Poles—

*Reeves Wood Preserver*  
costs little—easy to apply  
Write for Sample to test

THE REEVES CO.  
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"WHALEBONE"

## Fibre Track Insulation

DIAMOND STATE FIBRE CO.

Elmire, Del. Bridgeport, Penna. Chicago, Ill.

## FEDERAL SIGNAL CO.

Manufacturers } for { Automatic } either { A.C. }  
Engineers } Signaling } or { D.C. }  
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No Interlocking Switches Are Safe Without  
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## Kilby Frog & Switch Co.

BIRMINGHAM, ALA.

Tongue Switches, Mates, Frogs, Curves and  
Special Work of all kinds for Street Railways.

## TOOLS

for all classes of electrical construction and repair  
work. Write for catalog.

Mathias Klein & Sons Canal Station 25 Chicago

Transmission Line and Special Crossing  
Structures, Catenary Bridges

Write for our New Descriptive Catalog.

## ARCHBOLD-BRADY CO.

Engineers & Contractors

SYRACUSE, N. Y.



## The Simmen System

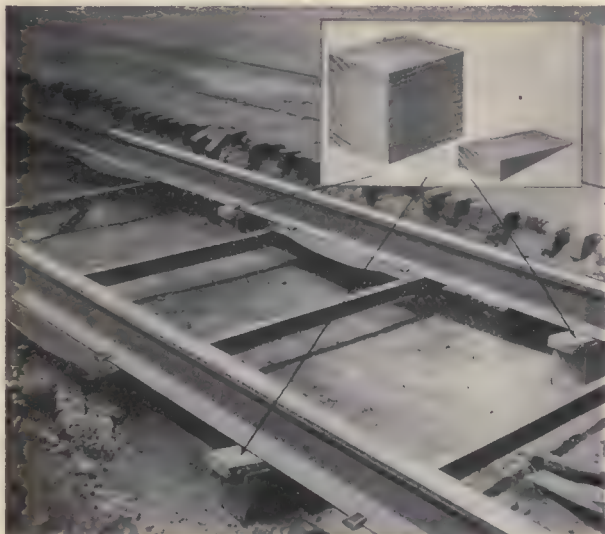


Direct Contact Between  
Dispatcher and Motorman

Write for Details

SIMMEN AUTOMATIC RAILWAY SIGNAL CO.  
1575 Niagara St., Buffalo, N. Y.





Economy in track-leveling means supplying your crew with material all ready for use. Here you will find

## “S-A” Blocks and Wedges for Track Leveling

a splendid help—for we furnish them cut to size, ready to place and drive up; only a few seconds' work at each block. Hard wood, accurately sawed; thousands in use by prominent Traction Companies.

Particulars gladly furnished—no obligation. Please state quantity required per season.

**THE STEELE-ALDERFER CO.**

JUNCTION STATION

Cuyahoga Falls, Ohio

Near Akron

Much depends upon culvert drainage — culvert strength—culvert service—durability.

Depend upon it—

**ACME**

Corrugated  
Anti-Corrosive

**CULVERTS**

—Do render perfect satisfaction in all respects.



99.90 %  
PURE

DEPEND UPON IT that “ACMES” will sturdily resist the elements. This is guaranteed by the thickness of gage, the purity of NO-CO-RO METAL of which they are made and their actual service record covering years past.

“ACME” (Nestable) Culverts would not have been ordered by all the railway and highway officials who HAVE ordered and reordered them for years if they did not reduce installation and maintenance costs to bedrock. Dependability counts.

SHIPPED SET-UP or K. D. Write today for some interesting culvert-service data—a file of orders, letters, etc., in fac-simile and our 56-page Culvert Catalog G-3.

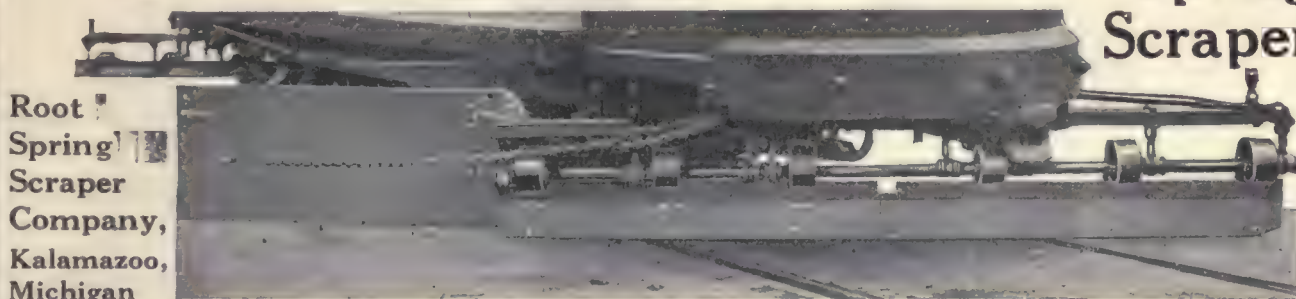
**THE CANTON CULVERT & SILO CO.**  
MANUFACTURERS  
CANTON, OHIO, U.S.A.

## INSURANCE AGAINST SNOW BLOCKADES

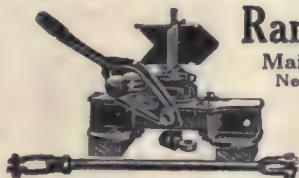
A blockade means loss of revenue. You can avoid this loss by having your cars equipped with ROOT SPRING SCRAPERS. They begin working when the snow begins falling and make it possible to maintain your schedule even during heavy snow storms. Scraper No. 6 (shown below) is especially well adapted to handle a heavy snow fall. It is replacing sweepers on many lines.

Send to-day for our Catalog

**ROOT  
Spring  
Scraper**



Root  
Spring  
Scraper  
Company,  
Kalamazoo,  
Michigan



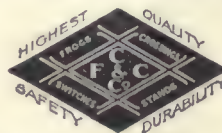
**Ramapo Iron Works**

Main Office, Hillburn, N. Y.  
New York Office: 30 Church St.

Automatic Switch Stands,  
T-Rail Special Work,  
Manganese Construction,  
Crossings, Switches, Etc.

**HIGHEST QUALITY**

**TRACK SPECIAL WORK**



**WE MAKE THIS GRADE ONLY**

**CLEVELAND FROG & CROSSING CO.**  
CLEVELAND, OHIO

**T** Rails and Nelsonville Filler  
and Stretcher Brick

offer all the advantages without the disadvantages of the groove rail.

Construction approved by City Engineers.

**THE NELSONVILLE BRICK CO., Nelsonville, Ohio**



## Continuous Operation of the Power Plant

is a matter of extreme importance to the electric railway man. There must be no failure to supply the current when it is needed.

The constant use of Dearborn Treatment guarantees a high percentage of efficiency from the boilers. Made to suit the water conditions shown by analysis, it keeps the boilers free from scale, so that they steam freely and quickly, all corrosive or pitting action of the water is arrested, and, in fact, the boilers are in condition to yield their full quota of power constantly, while the fuel consumption is greatly reduced.

Send gallon of water for analysis, and let us advise regarding your plant requirements.

**Dearborn Chemical Company**  
McCormick Building, Chicago

## Repair Shop Machinery and Cranes

Built by

**NILES-BEMENT-POND CO.**

111 Broadway, New York

Boston Philadelphia Pittsburgh Chicago  
St. Louis Birmingham, Ala London

AWARDED



## American Rail Bonds

Crown  
United States  
Twin Terminal  
Soldered

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Export Representative: U. S. Steel Products Co., New York  
Pacific Coast Representative: U. S. Steel Products Co.  
San Francisco Los Angeles Portland Seattle

## The Rail Joint Company

61 Broadway, New York City



100% Rail Joint

Makers of Continuous, Weber, Wolhaupter and  
100% Rail Joints  
Standard—Insulated—Step—Frog and Switch  
Protected by Patents  
Grand Prize, San Francisco, 1915

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

**FORD CHAIN BLOCK & MFG. CO.**  
142 Oxford Street, Philadelphia

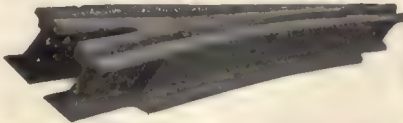
Scale will not adhere firmly to boilers, no matter how bad the feed water if

## DIXON'S BOILER GRAPHITE

is used. No other form of graphite fights the formation of scale so persistently and successfully. Booklet No. 108-T.

Made in Jersey City, N. J., by the  
**JOSEPH DIXON CRUCIBLE COMPANY**  
Established 1827 T-27

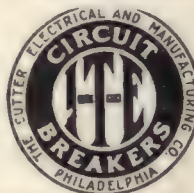
## Manganese Steel Track Work



FROM THE  
LARGEST LAYOUT  
TO THE  
SMALLEST INSERT

(1)

**St. Louis Steel Foundry, 1560 Kienlen, St. Louis, Mo.**  
Owned and operated by Curtis & Co. Mfg. Co., St. Louis.



## I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



The MODERN WAY of handling ASHES:  
GECO Pneumatic Ashhandling Systems  
GECO Steam Jet Ash Conveyors  
**GREEN ENGINEERING CO.**  
East Chicago, Indiana  
Catalogue 8—GECO Pneumatic Ash Handling Systems.  
Bulletin 1—Green Chain Grate Stokers.  
Bulletin 2—GECO Steam Jet Ash Conveyors.



CONSERVES energy and triples the steaming capacity of your boilers. Write for Catalog "C."  
**MURPHY IRON WORKS**  
Detroit, Mich. U.S.A.



## Oxweld Acetylene Co.

Largest Makers of Oxy-Acetylene Welding and Cutting Equipment in the World.

### Originators of the Oxweld Process

Full information on all classes of Welding and Cutting will be sent on request.

**Oxweld Acetylene Company**  
CHICAGO, ILL. NEWARK, N. J.

Advertisements for the

## Searchlight Section



Can be received at the New York Office of the Electric Railway Journal until

**Wednesday Noon**

For Issue of That Week



## SKIP HOIST FOR ASHES

Cheapest to install, operate and maintain.

Not affected by heat, grit or water.

Large capacity—High lift—Low power consumption.

Can be operated by a common laborer.

Simplest device built. One pull on the rope causes the bucket to ascend, discharge and return automatically.

Write for prices on this device, also for catalog No. 20 showing all modern coal and ash handling systems.

**R. H. BEAUMONT CO.**  
111 So. 5th St., PHILADELPHIA

## The Babcock & Wilcox Company

85 Liberty Street, New York

## WATER TUBE STEAM BOILERS

Steam Superheaters

Mechanical Stokers

Works BARBERTON, OHIO—BAYONNE, N. J.

### BRANCH OFFICES:

ATLANTA, Candler Building.  
BOSTON, 35 Federal St.  
CHICAGO, Marquette Building.  
CINCINNATI, Traction Building.  
CLEVELAND, New England Building.  
DENVER, 435 Seventeenth St.

HAVANNA, CUBA, Salle de Aguiar 104.  
HOUSTON, TEX., Southern Pacific Bldg.  
LOS ANGELES, I. N. Van Nuys Bldg.  
NEW ORLEANS, 533 Baronne St.  
PHILADELPHIA, North American Building.  
PITTSBURGH, Farmers' Deposit Bank Bldg.

SALT LAKE CITY, 705-6 Kearns Bldg.  
SAN FRANCISCO, Sheldon Bldg.  
SAN JUAN, Porto Rico, Royal Bank Bldg.  
SEATTLE, Mutual Life Building.  
TUCSON, ARIZONA, Santa Rita Hotel Bldg.

# FOSTER SUPERHEATERS

Greatly Increase Efficiency and Power of Steam Turbines.  
**POWER SPECIALTY CO.**  
Trinity Building, 111 Broadway  
NEW YORK

## RAILWAY UTILITY CO.

*Sole Manufacturers*

"Honeycomb" and "Round Jet" Ventilators for Monitor and Arch Roof Cars, and all classes of buildings; also Electric Thermometer Control of Car Temperatures.

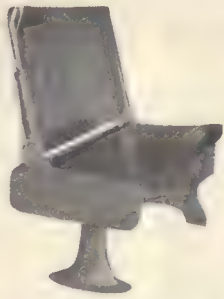
721 W. FULTON ST. Chicago, Ill. Write for Catalogue 1328 BROADWAY New York, N. Y.

## INSULATING TAPE



**STANDARD**  
Woven Fabric Co  
Walpole, Mass.





## H. & K. No. 300-A Slat Seat for City Service

Where an inexpensive, sturdy and sanitary seat is desired there is nothing better than the No.

300-A slat type. It has all the famous Hale & Kilburn features, such as pressed steel pedestals, "Walkover" reversing mechanism and proper shaping of the seat and back to make riding comfortable. This seat is furnished in polished maple, birch, cherry, ash, oak or mahogany, as specified. The vertical slatting of the back not only affords more comfort than horizontal slatting, but is also much handsomer in appearance.



### Hale & Kilburn Co.

Philadelphia      New York      Chicago  
Washington      San Francisco

## Full Power with High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

## Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

**The Buckeye  
Jack Mfg. Co.**  
Alliance, Ohio



3

## STERLING Insulating Varnishes and Compounds

HIGHEST GRADE      STANDARD OF QUALITY

Clear and Black Air Drying Insulating Varnishes  
Clear and Black Baking Insulating Varnishes  
Oil Proof Finishing Varnishes  
Impregnating Compounds  
Wire Enamels

FOR THE MANUFACTURER—OPERATOR—REPAIRER

Inquiries invited. Catalogue on request.  
We gladly assist in selection.

**THE STERLING VARNISH COMPANY**  
PITTSBURGH, PENNA.  
Manchester, England

## SEVEN THOUSAND TROLLEY POLES IN STOCK

Not Gas Pipe but High Carbon, Butt-Welded Poles Made from Special Skelp and Capable of Standing 35 to 40 Pounds Wheel Pressure on the Trolley Wire. Immediate shipment.

**NUTTALL - - PITTSBURG**

**T**HE readers of technical papers are busy men. Don't expect one flash of the Searchlight to reveal them all—or one insertion of your advertisement to be read by them all. Order your Want or For Sale Advertisement published four times or more. If all of the insertions are not needed we will return the full amount received for whatever space is not used.

Searchlight Department,  
ELECTRIC RAILWAY JOURNAL

## Ventilation—Sanitation—Economy—Safety

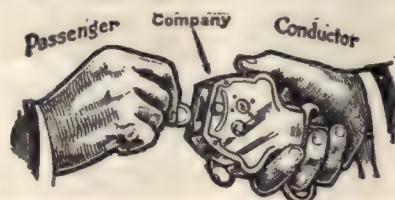
All Combined in

**THE COOPER FORCED VENTILATION HOT AIR HEATER**

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

**THE COOPER HEATER CO., CARLISLE, PA.**



**Direct  
Automatic  
Registration  
By the  
Passenger**

**Rooke Automatic  
Register Co.**  
Providence, R. I.





## Johnson Registering Fare Boxes

used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

WRITE FOR NEW BOOKLET

### JOHNSON FARE BOX COMPANY

Jackson Blvd. & Robey St.  
Chicago, Ill.

U. S. Metal & Manufacturing Co.  
165 Broadway, New York City, N.Y.

## UNION SPRING & MFG. CO. SPRINGS

### COIL AND ELLIPTIC

#### M. C. B. Pressed Steel Journal Box Lids

General Office: First Nat'l Bank Bldg.  
PITTSBURGH, PA.

Works: New Kensington, Pa.

50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.  
Missouri Trust Bldg., St. Louis, Mo.



## TICKETS as well as CASH FARES

Try these boxes on your one-  
man cars

**Cleveland Fare Box Co.**  
CLEVELAND, OHIO

# TULC

MANY SYSTEMS ARE USING TULC  
after first making most thorough tests under  
all conditions. Such tests have shown that  
it will cut lubrication costs in half.

**THE UNIVERSAL LUBRICATING CO.**  
Schofield Building CLEVELAND, O.

## KINNEAR Steel Rolling Doors FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fire-  
proof. Openings of any size may be equipped and the  
doors motor-operated if desired. Manufactured by the  
KINNEAR MANUFACTURING CO., Columbus, Ohio  
BOSTON PHILADELPHIA CHICAGO

## "Boyerized" Products Reduce Maintenance

Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
Case Hardened Bushings	Manganese Body Bushings
Case Hardened Nuts and Bolts	Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry  
40 different sizes of case hardened pins in stock. Samples fur-  
nished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

For the Answer to your Fare Collection Problems  
Write for

"Earnings Per Passenger Mile"  
It tells how the

**BONHAM TRAFFIC RECORDER**

Will Meet Your Needs

The Bonham Recorder Co., Hamilton, Ohio



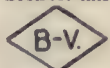
# WATER SOFTENING OR FILTRATION

FOR BOILER FEED AND ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

## The Standard for Speed, Accuracy, Durability B-V Visible Punch

Look for this



Trade Mark

Bonney-Vehslage  
Tool Company  
124 Chambers Street  
New York City



Factory  
Newark, N. J.

## The "Hycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

**THE ELECTRIC STORAGE BATTERY CO.**  
PHILADELPHIA

## S-W Shim Slack Adjusters Save Brakeshoes and Labor

SMITH-WARD BRAKE COMPANY, Inc.  
17 Battery Place, New York

W. R. Kerschner Co., Inc.  
Eastern Sales Agents  
50 Church St., New York City

The Big Three

**D & W Fuses, Deltabeston Wire  
Delta Tape**

D & W Fuse Co., Providence, R. I.



# SEARCHLIGHT SECTION

## FOR SALE

- 2—Cincinnati fourteen bench open car bodies.
- 8—Brill fourteen bench open cars, West. 56 Motors, Brill 22-E Trucks.
- 40—Brill ten bench open cars, West. 68 Motors, Peckham Trucks.
- 16—42' Interurban Cars, Baldwin Trucks, 4 West. 121 Motors.
- 25—Brill 20' Closed Cars, 2 West. 56 Motors, Brill 22-E Trucks.
- 40—Brill 20' Closed Cars, G.E. 1000 Motors, Peckham Trucks.
- 6—Brill 30' Express Cars complete, 4 G.E. 1000 Motors, Brill 27-G Trucks, AA-1 Air Brakes.
- 30—G.E. 90 Railway Motors complete.
- 20—G.E. 73 Railway Motors complete.
- 40—G.E. 1000 Railway Motors complete.
- 20—G.E. 800 Railway Motors complete.
- 18—G.E. 87 Railway Motors complete.
- 18—G.E. 57 Railway Motors complete. Form H.
- 12—G.E. 57 Railway Motors complete. Form A.
- 22—West. 12A Railway Motors complete.
- 12—West. 38B Railway Motors complete.
- 10—West. 112 Railway Motors complete.
- 18—West. 101-B-2 Armatures, Brand New.
- 6—West. 93-A-2 Armatures, Brand New.
- 2—West. 93 Armatures, Brand New.
- 14—G.E. 80-A Armatures, Brand New.
- 4—G.E. 87 Armatures, Brand New.
- 3—G.E. 73-C Armatures, Brand New.
- 6—G.E. 67 Armatures, Brand New.
- 12—G.E. 57 Armatures, second-hand, two turn.
- 14—West. 56 Armatures, second-hand.
- 40—K10 Controllers.
- 12—K28B Controllers.
- 26—K6 Controllers.
- 22—K11 Controllers.
- 12—K14 Controllers.
- 6—Brill 21-E Trucks, 7' 6" and 8' wheel base.

All of the above Apparatus is in first class condition for immediate service

For further particulars apply to

**W. R. KERSCHNER COMPANY, Inc.**  
50 Church Street, New York City

## Rotary Converter Wanted At Once.

300 to 600 kw., three or six phase; 25 cycle; 600 volts D.C. converter. A 400 kw. unit preferred. Three phase transformer or single phase transformers, 13,200 volts on primary side to go with the rotary. Oil-insulated, self-cooled, three phase transformer preferred. Starting panel and switchboard with equipment desired.

Would like to get in touch with anyone having part of or all of such equipment for sale or for lease for a period of nine months.

Give full particulars of make, time in service, machine numbers, location and price.

**Walter C. Slade, Supt. Power and Lines**  
The Rhode Island Company, Providence, R. I.

## For Sale for immediate delivery

3 Westinghouse 100 KVA 9000 volt primary, 340-370 volt secondary, 25 cycle transformers, having an inherent reactance of 15%.

## Wanted to purchase

one (1) 60 cycle 300 KW rotary converter with oil cooled transformers, wound for 33,000 volts primary 60 cycle and with secondary to suit rotary.

Address Elgin & Belvidere Electric Company, 105 So. LaSalle Street, Chicago, Ill.

## MACGOVERN & COMPANY, Inc.

FRANK MACGOVERN, Pres. & Gen. Mgr.

114 LIBERTY STREET

NEW YORK CITY

## Steam and Electrical Machinery

Air Compressors, Pumps, Hoists, etc.

## ARCHER & BALDWIN

114-118 Liberty Street New York City

TELEPHONE 4337-4338 RECTOR

Rotary Converters, 25 Cycle

4—150 K.W. General Electric type T.C., 4-150-750, 25 cycle, 3 phase, 575 volt rotary converters, 750 RPM., complete with 8-60 K.W. General Electric type H., 25 cy., 380-13200 volt, oil cooled single phase transformers.

Rotary Converters, 60 Cycle

2—150 K.W. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 RPM., complete with 4—100 K.W. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

Above will be sold with or without transformers.

## Railway Motors

4—75 to 90 H.P. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

Get Your Wants into the Searchlight



# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplayed advertisements cost **two cents a word**, minimum charge 50 cents an insertion, payable in advance.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Desk Room Wanted or For Rent, Business Opportunities, Employment Agencies, and Miscellaneous

For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplayed advertisements cost **three cents a word**, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost \$2.40 an inch.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

1/4 p. (1 1/2 x 3 3/4 ins.)	\$5.00	1 in. (1 x 2 1/2 ins.)	\$3.00
1/2 p. (2 1/2 x 3 3/4 ins.)	10.00	4 inches (4 x 2 1/2 ins.)	11.00
3/4 p. (3 1/2 x 3 3/4 ins.)	20.00	8 inches (8 x 2 1/2 ins.)	22.40
1 p. (4 1/2 x 3 3/4 ins.)	40.00	15 inches	40.50
1 page (10 1/2 x 7 ins.)	30 inches		\$80.00

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page	\$80 a page	18 pages	\$56 a page
3 pages	72 a page	26 pages	53 a page
6 pages	64 a page	40 pages	52 a page
12 pages	58 a page	52 pages	50 a page

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### FOR SALE

#### Life Guards for Sale

11 H.B. Life Guards complete, equal to new. Address W. R. Kerschner Company, Inc.

### PRACTICALLY NEW

2,200 tons 60-lb. A. S. C. E. Steel

# RAILS

The Best We Ever Handled

**ZELNICKER IN ST. LOUIS**

423 1st Nat. Bank Bldg. Chicago  
910 Hennen Bldg. New Orleans

### MISCELLANEOUS WANTS

#### Wheel Press Wanted

One 200 to 300 ton wheel press and a wheel boring mill or 36" swing lathe. Must be in first class condition. Address Frank Tripp, Elmira, N. Y.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

### POSITIONS WANTED

CHIEF electrician of 20 years' experience wants a job. Anything considered. Box 1163, Elec. Ry. Jour.

ENGINEER desires change, 3 years in present position as chief for city railway, 9 years' experience in central and substation construction and operation. References including present employer. Box 1155, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

ENGINEER desires change, at present maintenance of way engineer of 165 mile railway. Technical graduate and six (6) years' experience in street railway operation. References furnished upon request. Box 1176, Elec. Ry. Jour.

MANAGER in small city wishes a change. Large experience in railway and lighting business. Upbuilding and efficiency work a specialty. Box 1174, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

POSITION wanted by man with 15 years' experience as roadmaster and engineer of way and structure with a large Eastern road. Can give good references. Box 1177, Elec. Ry. Jour.

STREET railway superintendent wishes to make a change. Have had 20 years' experience in all branches. Box 1165, Elec. Ry. Jour.

FOREMAN painter. Young man of broad experience and proven ability. Sixteen years with various car building and street railway companies. Thoroughly familiar with piece work. Box 1181, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

### POSITIONS VACANT

AUDITOR for car plant, building all kinds of steel and wooden cars for domestic and export use. Man required must have thorough knowledge of accounting and cost work on car construction. No other need apply. Good position and salary for man possessing these qualifications. Plant ideally located. Applications will be privately examined by financial officer and treated as extremely confidential. Box 1170, Elec. Ry. Jour.

EXPERT armature winder and electrician who is familiar with general maintenance and capable of taking full charge of rolling stock of small road wanted. State experience, references, salary desired, and all other necessary information in first letter. Address Box 1182, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

CORRESPONDENT thoroughly acquainted with electric railway organization methods. Young man of some years' actual experience in electric railway executive offices preferred. Must be able to write strong, forceful letters. Salary to start \$125 a month. Future depends on the man. Location, New York City. Application must state education and experience in detail, and give age and references. Box 1184, Elec. Ry. Jour.

### AGENTS AND SALESMEN

#### Power Salesman

Power salesman at present employed by large corporation, technical graduate, 10 years' experience in testing and commercial work, seeks connection with a corporation where initiative and ideas are important. I can develop and increase the connected load in addition to creating prestige and good will for such a corporation. A personal interview with sales managers is requested, Box 1183, Elec. Ry. Jour.

#### Salesman Wants Position

Technical man wants general line railway supplies and specialties for this territory on commission. Bank references. J. L. Morgan. Kans. City Life Bldg., Kansas City, Mo.

## THE ART OF BUYING

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Service Department is ready to serve you, Mr. Manufacturer.

ELECTRIC RAILWAY JOURNAL

239 West 39th Street, New York



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

**Acetylene Apparatus.**  
(See Cutting Apparatus,  
Oxy-Acetylene.)

**Acetylene Service.**  
Oxweld Acetylene Co.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Alloys, Steel and Iron.**  
Titanium Alloy Mfg. Co.

**Anchor, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Automobiles and Busses.**  
Brill Co., The J. G.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Taylor Elect. Truck Co.

**Axles, Car Wheel.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbitting Devices.**  
American General Engrg. Co.  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Bankers and Brokers.**  
Halsey & Co., N. W.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings and Bearing Metals.**  
American General Engrg. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Hardy & Sons, Wm. A.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings, Roller and Ball.**  
Gurney Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.

**Bearings, Roller Side.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.  
Zelnicker Sup. Co., W. A.

**Blow Torches for Soldering and Brazing.** (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boilers.**  
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Bond Clips.**  
Electric Railway Improve. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms.** (See also Poles, Ties, Posts, Etc.)  
Bates Expanded Steel Truss Co.  
Electric Service Supplies Co.  
Int'l Creosoting & Constr. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

**Brake Adjusters.**  
Kerschner Co., Inc., W. R.  
Smith-Ward Brake Co.

**Brake Shoes.**  
Amer. Brake Shoe & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**  
Allis-Chalmers Mfg. Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Westinghouse Trac. B. Co.

**Brooms, Track, Steel or Rattan.**  
Western Electric Co.  
Zelnicker Sup. Co., W. A.

**Brush Holders.**  
Anderson Mfg. Co., A. & J. M.

**Brushes, Carbon.**  
Dixon Crucible Co., Jos.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Buckets, Grab.**  
Beaumont Co., R. H.

**Bumpers, Car Seat.**  
Electric Service Supplies Co.  
Imperial Rubber Co.

**Bunkers, Coal.**  
Beaumont Co., R. H.

**Bunting.**  
Boyle & Co., Inc., John.

**Bushings, Fibre.**  
Diamond State Fibre Co.

**Bushings, Case Hardened and Manganese.**  
Bemis Car Truck Co.

**Bushings, Rubber.**  
Imperial Rubber Co.

**Buttons.** (See Badges and Buttons.)

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For complete information regarding Model 370, write for Bulletin No. 2003. Other models in this group are Model 341 A.C. and D.C. Portable Voltmeter, described in Bulletin 2004; Model 310 Single-Phase and Direct Current Portable Wattmeter, and Model 329 Portable Polyphase Wattmeter, both described in Bulletin No. 2002.

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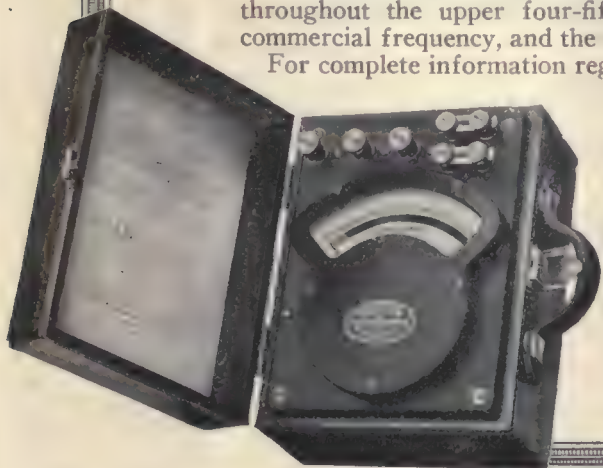
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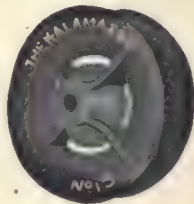
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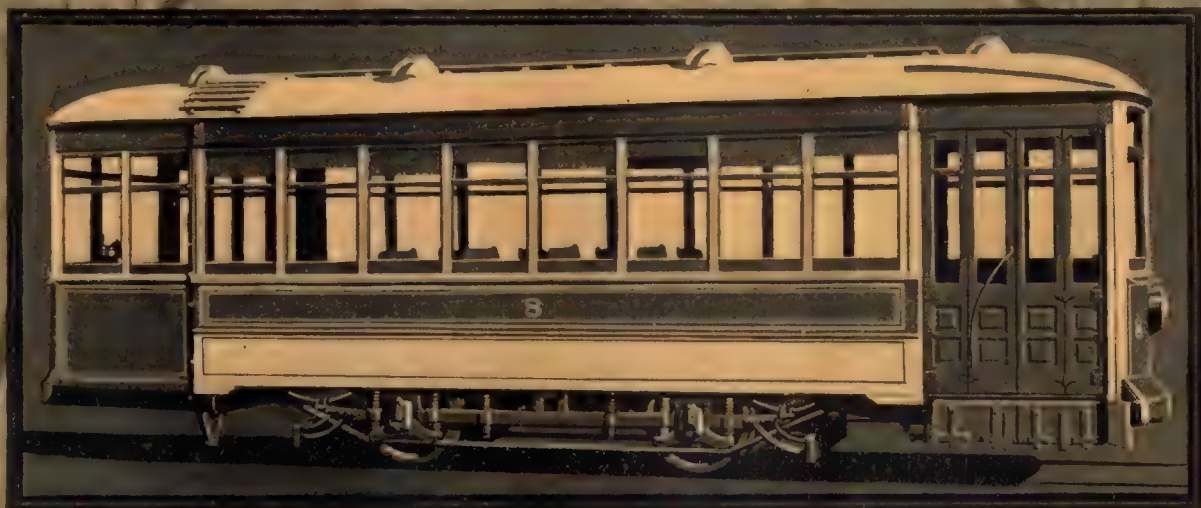
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Near-side cars are built both for single- and double-end operation. The car illustrated is a double-end type and is for one-man operation. The generous size of the platforms facilitates ingress and egress, and yet there is no waste space, as seats are provided and the platform at the rear is used for additional standing space. The carbody has seats for 28 persons.

THE J. G. BRILL COMPANY,  
AMERICAN CAR COMPANY,  
G. C. KUHLMAN CAR COMPANY,  
WASON MFG. COMPANY,

PHILADELPHIA, PA.  
ST. LOUIS, MO.  
CLEVELAND, OHIO  
SPRINGFIELD, MASS.



# The Latest Youngstown Cars

are of the 24-inch wheel center entrance type.

The Mahoning & Shenango Railway & Light Co., Youngstown, Ohio, selected G-E motors and emergency straight air brakes with CP-27-B compressors for these cars.

The design of the CP-27-B compressor is such that ample clearance between the compressor and roadbed is obtained when

mounted on 24 inch wheel cars, as can be seen in the illustration. This compressor is of the well-known G-E center gear type and has a piston displacement of 15.7 cubic feet per minute. Compactness, strength, reliability, accessibility and low maintenance are a few of the reasons why it has been adopted as standard on hundreds of roads.



6365

ELECTRIC RAILWAY JOURNAL,  
Sept. 9, 1916

24 IN. WHEEL  
COMPRESSION



## General Electric Company

General Offices  
Schenectady, N.Y.



Sales Offices  
in all large cities



Records and Cost Reduction in Car Maintenance Work

# ELECTRIC RAILWAY JOURNAL

New York, September 16, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 12 10c a copy



**Cannot Rust**  
**Does not need Paint**

**Asbestos Protected Metal**

No other roofing and siding has as many advantages as APM—note its details of construction. Selected steel sheets, completely immersed in a hot asphaltic compound, onto which is imbedded asbestos fibre. No wonder it is corrosion-proof, weather-proof, and long-lived—it requires no paint nor other maintenance and involves no depreciation charges. *Bulletin 55G gives the full details.*

**Asbestos Protected Metal Company**  
Pittsburgh

Montreal, Canadian Asbestos Co.  
London, Dock House, Billiter St.

**APM**

**ASBESTOS PROTECTED METAL**





## Public Opinion

"GENTLEMEN," said the General Manager at a board meeting, "we have devoted a year or more to studying the very important subject, 'Public Opinion' of our property.

"Our publicity man has been in close touch with all the representatives of the newspapers that serve the communities along our lines, giving them facts. I, and others, have attended board of trade and similar meetings and made several speeches. We have become better acquainted with the business men who count in the various communities we serve and of course you all know that the attitude of the press and the public in general towards our company is very much better. BUT, there is one thing we ought to correct and that is our old motor equipments.

"On the lines where we are operating with Westinghouse motors and HL control everything is fine. We have a number of old cars, however, that Joe, our Superintendent, says there is no use spending any more money on. They are too heavy and the electrical equipment is obsolete and expensive.

"I have arranged to send Joe and one or two of his men to the Atlantic City convention next month, to study the new Westinghouse motors and control, and their motors for low floor cars, and make a full report."

"I am satisfied that it is the right thing to do," said the President. "We approve of your plans."

### Westinghouse Electric & Manufacturing Co.

Sales Offices in All  
Large American Cities



East Pittsburgh,  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 12

NEW YORK, SEPTEMBER 16, 1916

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

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Circulation of this issue 7250 copies



# Westinghouse

## Induction Feeder Regulator

Feeder Regulators, always of great advantage on central station systems, are a particularly good investment this Fall—Loads are heavy and copper is high in price.

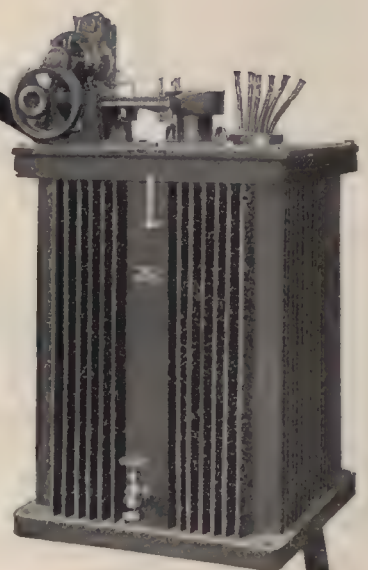
Westinghouse Induction Feeder Regulators are furnished for commercial circuits of any capacity, phase, frequency or voltage.

It is to your advantage to investigate what Westinghouse Feeder Regulators will accomplish on your lines.

Ask for DL Nos. 3916 & 3919.



Single-phase Oil Insulated Self-Cooling Feeder Regulator



Three-phase, Air Blast Feeder Regulator



Three-phase Oil Insulated Self-Cooling Feeder Regulator



Three-phase Oil Insulated Water-Cooled Feeder Regulator



## Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Bluefield, W. Va.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.  
Charleston, W. Va.

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Chicago, Ill.  
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Dallas, Texas  
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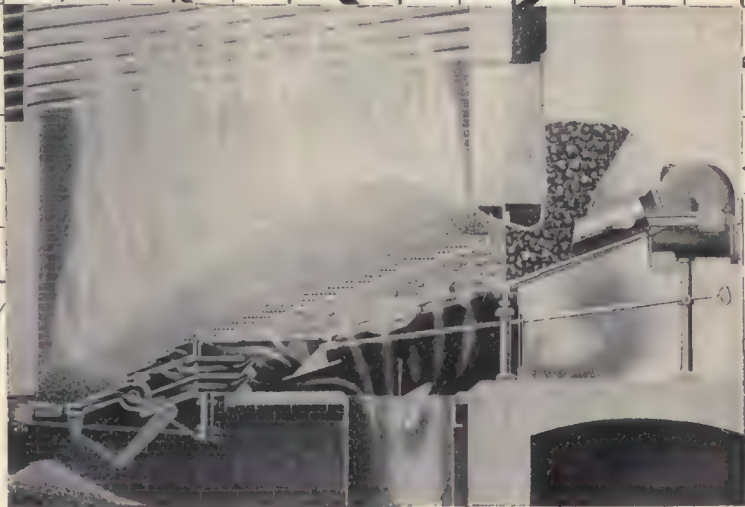
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Washington, D. C.  
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# From a Banked Fire To 480% Load in 8 Minutes

460  
440  
420  
400  
380  
360  
340  
320  
300  
280  
260  
240  
220  
200  
180  
160  
140  
120  
100  
80  
60  
40  
20  
0

PER CENT BOILER RATING



## The Westinghouse Underfeed Stoker

When the rush hour comes with its sudden demand on the boilers, you can always make a quick start with the Westinghouse Underfeed Stoker for the depth of the fuel bed at all rates of combustion is sufficient to resist the air pressures required.

WESTINGHOUSE ELECTRIC & MFG. CO.  
East Pittsburgh, Pa.

FIRE BANKED 0 2 4 6 8 10 12 14 16 18  
FOR 6 HOURS

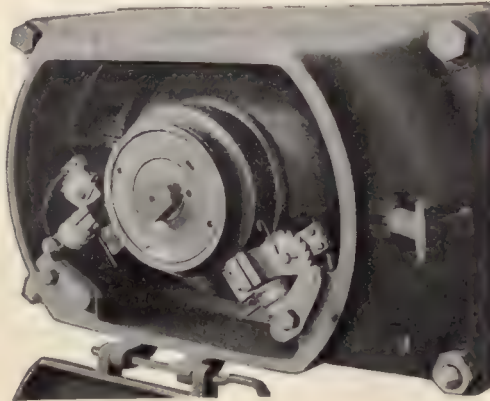
TIME IN MINUTES

4 36 38

# Westinghouse



## "Bungalow" type of Westinghouse Air Compressors



### Brush Holders

—Are permanently located slightly back of neutral position, the most efficient one, since armature rotates in one direction only.

—Are located in lower quadrants, making accessibility easy from the pit. Brushes and holders tend to keep themselves clean.

—Are fastened to motor case with one tap screw and one dowel pin, making removal exceptionally easy.

### Brush Holder Springs

—Are a combination coil and flat spring, which gives double amplitude, takes care of very small vibrations, eliminates chattering, and improves commutation.

—May be given any tension desired by moving the wire lever on the notched dial.

—Provides resting place for flat end of spring while brushes are being taken out.

—Are adjusted without removing and without use of tools.



*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:  
Westinghouse Building

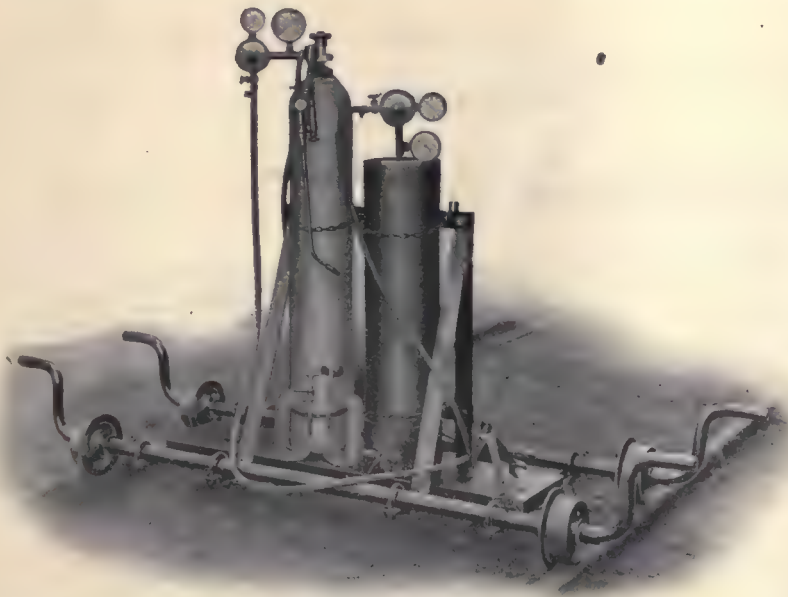
CHICAGO:  
Railway Exchange Building



NEW YORK:  
City Investing Building

ST. LOUIS:  
Boatmen's Bank Building





## Permanence with Convenience

O-B G.W. Bonds, installed by the Gas Weld Process, go on to stay. The contact does not deteriorate.

The Gas Weld apparatus is not expensive, can be mounted on any kind of a truck, can be used by any workman after a little practice and has been found invaluable for odd jobs in the repair shop.

The O-B G.W. Bond, on the rail, has a tapered terminal which cannot be harmed by wagon wheels, etc.

Full details on request.

### The Ohio Brass Co.

Mansfield

Ohio







## “The Function of the Manufacturer in the Electric Railway Industry”

**T**HERE'S a mighty interesting little booklet on this subject in existence. We published it several months ago.

“The function of the manufacturer is the advancement of the art.”

The manufacturer organizes his business to produce a high efficiency and constant improvement in the products he furnishes. Or to develop a new product which will fulfill a practical need.

The first step in his service is to give *information*.

That is why the use of advertising has grown so enormously.

It is of enormous *service* to *both* the buyer and the seller.

No commercial proposition can live and grow on any one sided basis. It must serve the mutual interest of the buyer and the seller.

Advertising lives and grows.

The practical electric railway official *seeks* the service of the advertising pages of the ELECTRIC RAILWAY JOURNAL. He especially seeks those pages in the ANNUAL CONVENTION NUMBER because he knows that in this issue every year there is a wealth of valuable suggestion for him advanced by many manufacturers who do not make a *continuous* effort to keep such information and suggestion before the industry throughout the year.

He knows that on account of the particularly active condition in the industry at the time of the Convention for the exchange of ideas and information that many manufacturers withhold their most recently developed ideas for promulgation at this especially *receptive* period.





He knows that in this particular issue of the Journal he will find a more *complete* fund of practical suggestions from the manufacturing branch of the industry than is published between two covers anywhere else or at any other time.

These suggestions and the information are valuable to him. He studies them—keeps them at hand for reference and acts on them as occasion demands.

The manufacturer who has any thing worth telling to the industry does a service both for himself and the industry by presenting his message through this, the most *comprehensive* issue of the year.

**The Annual Convention Number**  
**will be dated September 30**  
***You have no time to lose!***

239 West 39th Street, New York



# Phono-Electric



## Increasing Wire Life on Up-grades

The ability of Phono-Electric to resist wear and to handle heavy currents is conspicuous on the long grades of the famous Brooklyn Bridge. This bridge has grades approximating 3 per cent.

Here Phono-Electric consistently gives two to three times the life of ordinary trolley wire. It offers no more difficulty in transmitting current to the cars when they are accelerating up the long grades than the same cross section (No. 0000) offers on level lines with practically the same traffic.

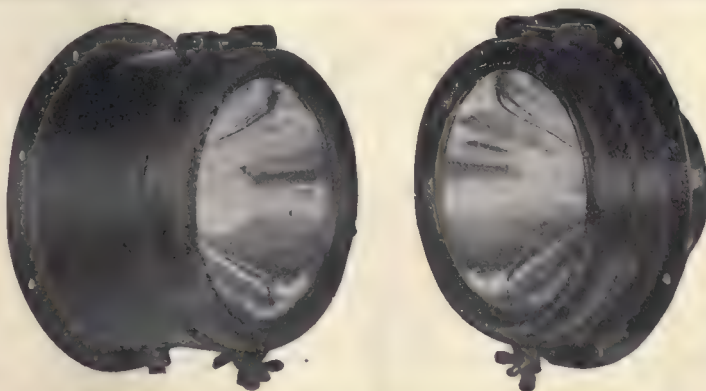
**BRIDGEPORT BRASS COMPANY**  
BRIDGEPORT CONNECTICUT



# ***"Golden Glow" Headlights***

*with the Famous "Golden Glow" Mirror Reflectors  
They Penetrate Fog*

***"Golden Glow"  
for  
City Service***



"Golden Glow" Headlights are equipped with the famous "Golden Glow" mirror reflectors. Each reflector is moulded from special glass, ground to a true parabola, polished to a mirror finish and silvered as would be the finest French plate glass mirror. "Golden Glow" mirrors cannot be equalled and cannot be duplicated by any other manufacturer, because the machinery for doing this is special and patented.

The glass used in "Golden Glow" reflectors has a rich golden-green color which absorbs the ultra-violet, violet and other high frequency rays, thus projecting a beam of golden-yellow light which is non-blinding and wonderfully adapted to the penetration of fog, moisture and dust.

"Golden Glow" Headlights for city service are far superior to any other headlight to be had on account of the greater volume of light projected, their economy and their non-blinding features. This also applies to those for interurban service, which may be operated at a cost insignificant as compared with arc headlights.



***"Golden Glow"  
For  
Interurban  
Service***

*Allow us to Demonstrate a "Golden Glow" on your Cars*

## **ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

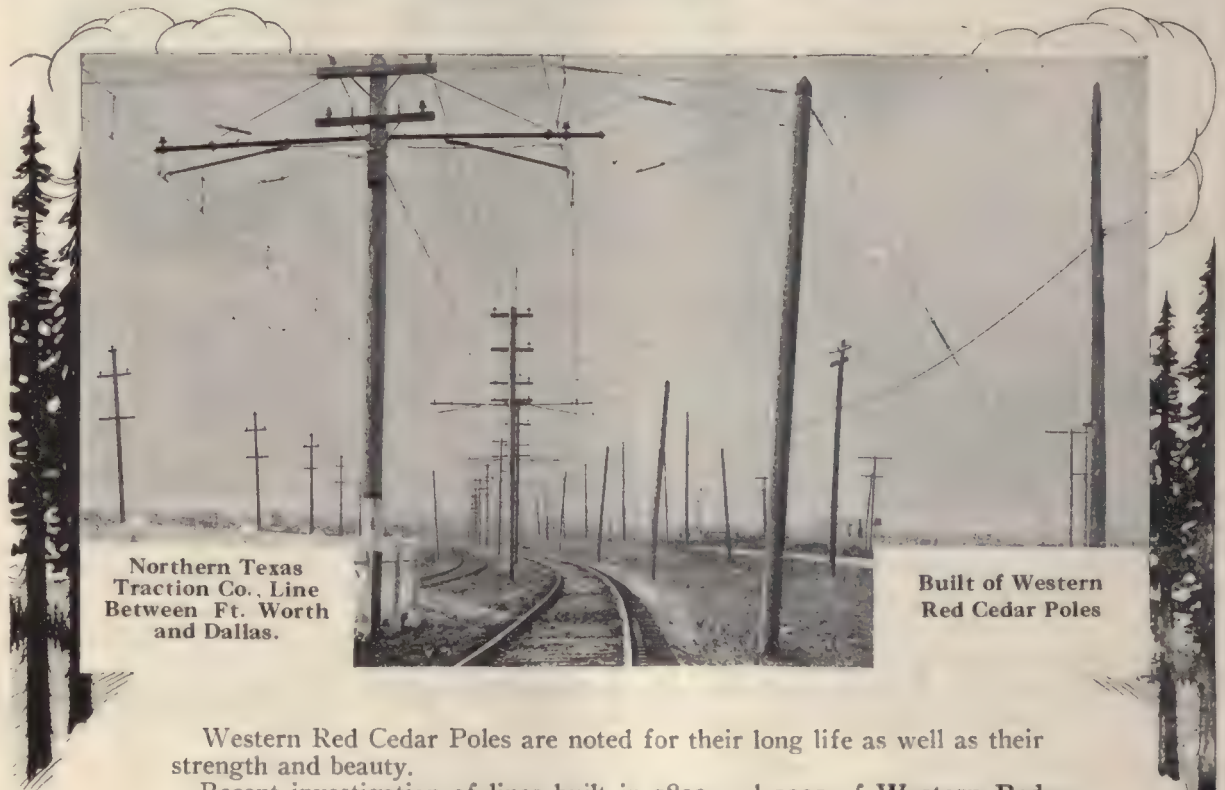
NEW YORK  
50 Church Street

CHICAGO  
Monadnock Bldg.



# Western Red Cedar Poles

Long Life—Great Strength—The Most Beautiful of All Poles



Northern Texas  
Traction Co. Line  
Between Ft. Worth  
and Dallas.

Built of Western  
Red Cedar Poles

Western Red Cedar Poles are noted for their long life as well as their strength and beauty.

Recent investigation of lines built in 1899 and 1900 of **Western Red Cedar Poles** show that the poles are practically in as good condition as when first placed, and good for many more years of hard service.

Some of these lines are in Texas, some in Minnesota, and in other sections, east, west, north, south, including a variety of climate and soil conditions.

The experience of many electric traction companies shows that **Western Red Cedar Poles** meet the severest tests on the curves and wherever the strain and pull are heaviest.

**Western Red Cedar Poles** have great strength. Official tests by the U. S. Forestry Service (Project L-31A) show that the average **Modulus of Rupture of Western Red Cedar Poles** is 6910 lbs. per square inch. This is greater than that of any other specie of pole timber in general use throughout the country.

**Western Red Cedar Poles** are light weight. That means lower freight cost and less cost to erect; easier to handle; low first cost; low maintenance cost; non-conductors of electricity. Their sound butts contribute greatly to their marked strength. They have no large knots. They make the most beautiful line.

*Write us for any Pole Information you want.*

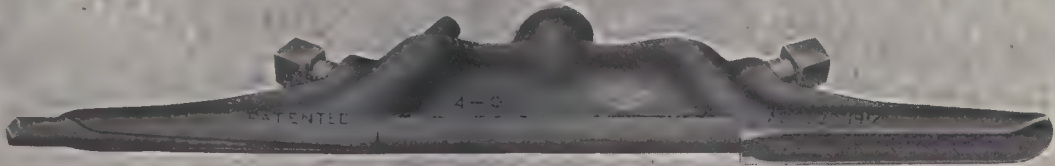
## Western Red Cedar Association

Peyton Building

Spokane, Washington



# SAMSON



# SPLICERS

## "Lowest Cost per CAR MILE"

This is the reason no wise road ever changes from *Samsons*. Once introduced on any property the unique service that *Samsons* give brings them forcibly and favorably to the line superintendent's and purchasing agent's attention. You needn't buy *Samsons* so often—and they stay up.

*Samson* splicers are non-arc-ing. They do not form hard spots in trolley. Strength is provided in excess of new wire. *Samsons* stay upright in the span.

*Samson* design is an evolution, through constant study of splicers under actual operation. They represent the last word in splicer efficiency.

For "Service Efficiency" in any overhead material specify "Drew." Catalogue for reference sent free on request. Ask for it.

### Drew Electric & Mfg. Co.

1016 E. Michigan St.

Indianapolis, Ind.

#### District Representatives

Holden & White, Inc.,  
1305 Fisher Building,  
Chicago, Ill.  
Brown & Hall Sup. Co.,  
1124 Pine Street,  
St. Louis, Missouri  
Railroad Signal Sup. Co.,  
Hackney Building,  
St. Paul, Minnesota  
Wm. F. McKenney,  
54 First Street,  
Portland, Oregon

Frank F. Bodler,  
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661 Calvert Building,  
Baltimore, Maryland  
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1312 Healey Building,  
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C. E. A. Carr,  
2 Toronto Street,  
Toronto, Ont., Canada  
H. S. Salt, (Export Agent)  
114 Liberty Street,  
New York, N. Y.

**DREW**  
MEANS "SERVICE EFFICIENCY"



If you are using an out-of-date list of electric railways, you may be surprised to know that in one year there are 3436 changes in electric railway officials.

# **McGRAW ELECTRIC RAILWAY LIST**

*August, 1916*

Published Semi-Annually  
in Connection with the  
**McGraw Electrical Trade Directory**  
[ Railway Edition ]

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Subscription Price \$5.00 per Year  
Single Copies \$3.00

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**McGraw Publishing Co., Inc.**  
239 West 39th Street  
New York

Last year 1144 officials or heads of departments left the field; 1104 new ones entered the field; 1188 changed from one company to another. Thirty-five percent of the list of names changed in one year.

The lesson is obvious. Send for the August, 1916 issue of the McGraw Electric Railway List at once. \$3.00 per copy or \$5.00 per year. Issued in August and February.



# “Continued vigilance is the price of business”

—*Maxim of a successful business getter.*

Railway operation is a **big** business where **continued** vigilance is a **big** factor.

No permanently successful business—military campaign—or railway property can be built up where the vigilance factor is not **prominent**.

If vigilance is a desirable condition where dollars only are at stake—how much more desirable it is where lives and dollars depend on it as in railway operation.

United States Automatic Electric Signals provide the vigilance factor with machine precision.

Based on service tests and service results, it has been repeatedly shown that the economies they provide more than pay for the cost of the vigilance.

“Then why do some roads operate without them?” we have been asked.

Simply because their turn has not yet arrived for the expensive SMASH which is too often waited for as the buy-word.



**United States  
Electric Signal Co.**

West Newton, Massachusetts

Western: Frank F. Bodler  
Monadnock Bldg., San Francisco  
Chicago, Warren Moore Osborn  
McCormick Bldg.

Foreign:  
Forest City Electric Service Supply Co.  
Salford, Eng.



# The ELRECO Tubular Pole is the Strongest Practicable Pole

One of the most efficient structural shapes known to engineers is the I-beam. But in utilizing an I-beam due care must be given to its installation with respect to the maximum strength of the section and the load to be carried.

The impracticability of such a structure for withstanding strains in *all* directions is self-evident.

The only shape that combines the highest limit of efficiency in unit weight for all-around strength is the circular tube.

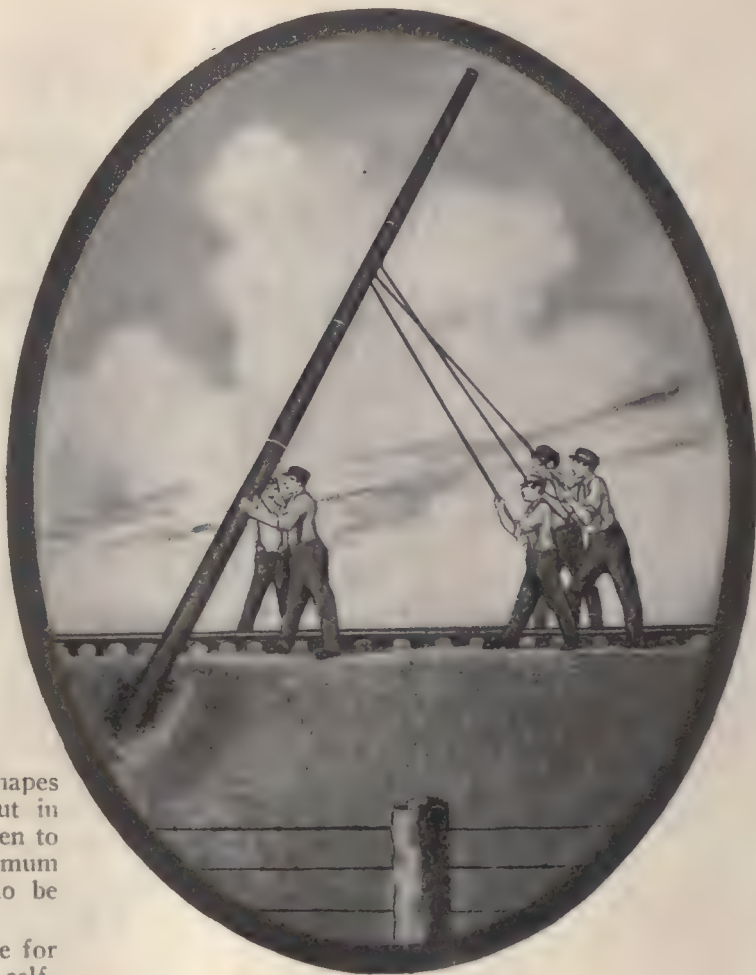
As the circle is the symbol of perfection in geometry, so is the tube the symbol of perfection in poles.

For solid proof consider this case. A 30 ft. Elreco Tubular Pole made up of 6 in., 5 in. and 4 in. sections, will weigh about 50 lb. lighter and cost about \$1.00 less than any other form of metal pole of the same all-around strength.

Elreco Tubular Poles are not in use by hundreds of thousands because they were the only ones available in the past, but because they *were* and *are* the best.

Elreco Tubular Poles have made good *at all times* as the best poles, against every other form, style and shape of pole conceivable.

In the City of Chicago more than 50,000 Elreco Poles are in service. Other Cities throughout the World have their proportionate share.



## ELRECO Tubular Poles

Combine  
Lowest Cost  
Lightest Weight  
Least Maintenance  
Greatest Adaptability

### ELECTRIC RAILWAY EQUIPMENT CO.

Cincinnati, Ohio

New York: 30 Church Street





# "Armco" Iron Corrugated Culverts



Resists Rust

## Full and Part Circle

For Railroad and Highway Drainage



Resists Rust

## Save Work, Weariness and Worry

They are the easiest to transport and install, only common labor and common sense being required. They are Tough, Reliable and Lasting. Watchful waiting for trouble is no part of the program. Once in place they are on the job For Keeps.

For information and prices on Rust-Resisting "Armco" (American Ingot) Iron Culverts (Full and Part Circle), Siphons, Flumes, Sheets, Roofing and Formed Products, write the Nearest Manufacturer.

**Arkansas, Little Rock**  
Dixie Culvert & Metal Co.  
**California, Los Angeles**  
California Corrugated Culvert Co.  
**California, West Berkeley**  
California Corrugated Culvert Co.  
**Colorado, Denver**  
R. Hardesty Mfg. Co.  
**Delaware, Clayton**  
Delaware Metal Culvert Co.  
**Florida, Jacksonville**  
Dixie Culvert & Metal Co.  
**Georgia, Atlanta**  
Dixie Culvert & Metal Co.  
**Illinois, Springfield**  
Illinois Corrugated Metal Co.  
**Indiana, Crawfordsville**  
W. Q. O'Neill Co.  
**Iowa, Des Moines**  
Iowa Pure Iron Culvert Co.  
Independence Culvert Co.  
**Iowa, Independence**

**Kansas, Topeka**  
The Road Supply & Metal Co.  
**Kentucky, Louisville**  
Kentucky Culvert Mfg. Co.  
**Louisiana, New Orleans**  
Dixie Culvert & Metal Co.  
**Maryland, Munsey Bldg.**  
Baltimore, Wm. M. Baker  
**Massachusetts, Palmer**  
New England Metal Culvert Co.  
**Michigan, Bark River**  
Bark River Bridge & Culvert Co.  
**Michigan, Lansing**  
Michigan Bridge & Pipe Co.  
**Minnesota, Minneapolis**  
Lyle Corrugated Culvert Co.  
**Minnesota, Lyle**  
Lyle Corrugated Culvert Co.  
**Missouri, Moberly**  
Corrugated Culvert Co.  
**Montana, Missoula**  
Montana Culvert & Flume Co.

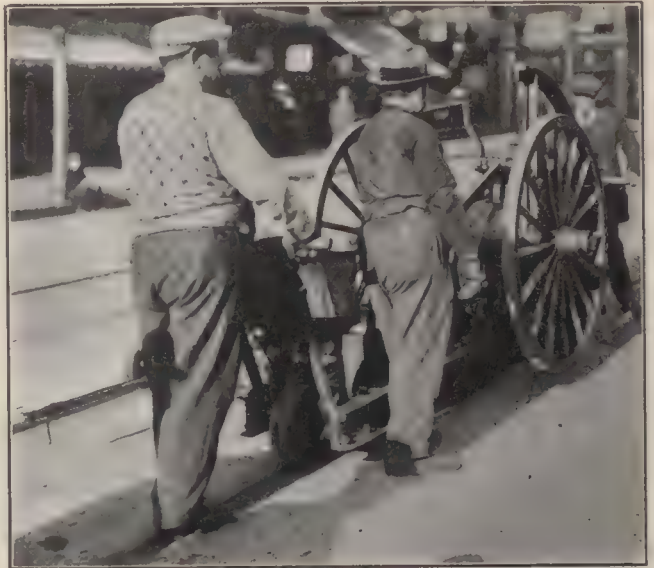
**Nebraska, Lincoln**  
Lee-Arnett Co.  
**Nebraska, Wahoo**  
Nebraska Culvert & Mfg. Co.  
**Nevada, Reno**  
Nevada Metal Mfg. Co.  
**New Hampshire, Nashua**  
North-East Metal Culvert Co.  
**New Jersey, Flemington**  
Pennsylvania Metal Culvert Co.  
**New York, Auburn**  
Pennsylvania Metal Culvert Co.  
**North Dakota, Wahpeton**  
Northwestern Sheet & Iron Works  
**Ohio, Middletown**  
The Ohio Corrugated Culvert Co.  
American Rolling Mill Co.  
**Oklahoma, Shawnee**  
Dixie Culvert & Metal Co.  
**Oregon, Portland**  
Coast Culvert & Flume Co.

**Pennsylvania, Warren**  
Pennsylvania Metal Culvert Co.  
**South Dakota, Sioux Falls**  
Sioux Falls Metal Culvert Co.  
**Tennessee, Nashville**  
Tennessee Metal Culvert Co.  
**Texas, Dallas**  
Wyatt Metal Works  
**Texas, El Paso**  
Western Metal Mfg. Co.  
**Texas, Houston**  
Lone Star Culvert Co.  
**Utah, Woods Cross**  
Utah Corrugated Culvert & Flume Co.  
**Virginia, Roanoke**  
Virginia Metal Culvert Co.  
**Washington, Spokane**  
Spokane Cor. Culvert & Tank Co.  
**Wisconsin, Eau Claire**  
Bark River Bridge & Culvert Co.



# Making Old and New Track Alike

on the



RECIPROCATING TRACK GRINDER AT WORK IN  
WORCESTER, MASS.

## Worcester (Mass.) Consolidated Street Railway

The work included the grinding down of joints and cups and the removal of corrugations. Incipient low joints were also smoothed down and all the new track recently laid on Main Street between Lincoln Square and Chandler Street was gone over at the joints with this

## Reciprocating Track Grinder

to insure better service and longer life from rails.

You, too, will find the use of a Reciprocating Track Grinder saves wear and tear on rolling stock and equipment as well as enormous savings in replacing and maintaining track.

A pretty good bit of evidence of satisfaction this machine is giving is shown in the fact that wherever once used repeat sales usually result.

Write for a list of roads using it.

### Railway Track-work Co.

30th and Walnut Sts., Philadelphia



## Permanent Track at Less Cost

ANY  
TYPE  
OF  
BASE

OPEN  
OR  
CLOSED  
TRACK

## Stop Building Perishable Track



Make your road a highway of steel in every sense of the word. The steel rails should rest on a foundation of steel. They should not go down on ties that begin to rot soon after they are buried. Put them on

## International Steel Twin Ties

They are a permanent addition to your road values. They do not have to be pulled up every little while for replacement, interfering with schedules, increasing maintenance cost, "de-stabilizing" your whole system. All that is necessary to see why roads throughout the country are making International Steel Twin Ties part of their standard equipment is to try the ties on a section of your track, or ask your neighbor for results obtained with the International Steel Twin Ties.

Creeping and spreading of the rails are virtually unknown with these steel Ties.

Tie rods are dispensed with. Gauge spacers are unnecessary. Unskilled labor can take care of the installation. And the first cost in paved street construction is less than wooden tie construction on concrete.

We will be pleased to furnish an estimate of cost, together with working plans of different types of construction now in use. Write us for the facts.

We have a stock of steel on hand and can make prompt shipment of ties

## The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal.,  
Los Angeles, Cal., Seattle, Wash.

R. I. Cooper Co.,  
Salt Lake City, Utah.

J. E. Lewis & Co.,  
Dallas, Texas.

Maurice Joy,  
Philadelphia.

William H. Ziegler,  
Minneapolis, Minn.



# Columbia Trolley Wheels For Every Kind of Weather



Our splendid foundry facilities enable us to turn out perfect trolley wheels by the thousands at moderate prices.

In addition to our standard solid trolley wheels for general service, we direct your attention to the

## Columbia Sleet Cutting Wheel

The ideal trolley wheel for insuring uninterrupted collection of current during the prevalence of hail, sleet, snow or ice. Does its work effectively without the aid of auxiliary sleet-cutting devices. *Beat Winter to it*, by ordering your Columbia sleet wheels now!

Columbia trolley wheels of both types in diameters of 4-in., 5-in. and 6-in. are in stock ready for immediate shipment. You can meet many other of your wants by ordering from this general list of Columbia products.

### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

### CAR EQUIPMENT

Armature and Axle Bearings  
Armature and field coils  
Bearings (Bronze and Iron)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or mall. iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



# Teach Your Motorman Correct Acceleration



**ECONOMY**  
  
**METERS**

**I**T has a mighty important influence on power consumption, life of equipment and on comfort and safety of passengers.

It is generally accepted that rapid acceleration is economical. In other words, the more rapid the rate of acceleration the greater the economy in power consumption.

On the other hand, it is possible to accelerate **too rapidly**. "Cannon ball" acceleration damages equipment, causes discomfort to passengers and, through slipping wheels, wastes power.

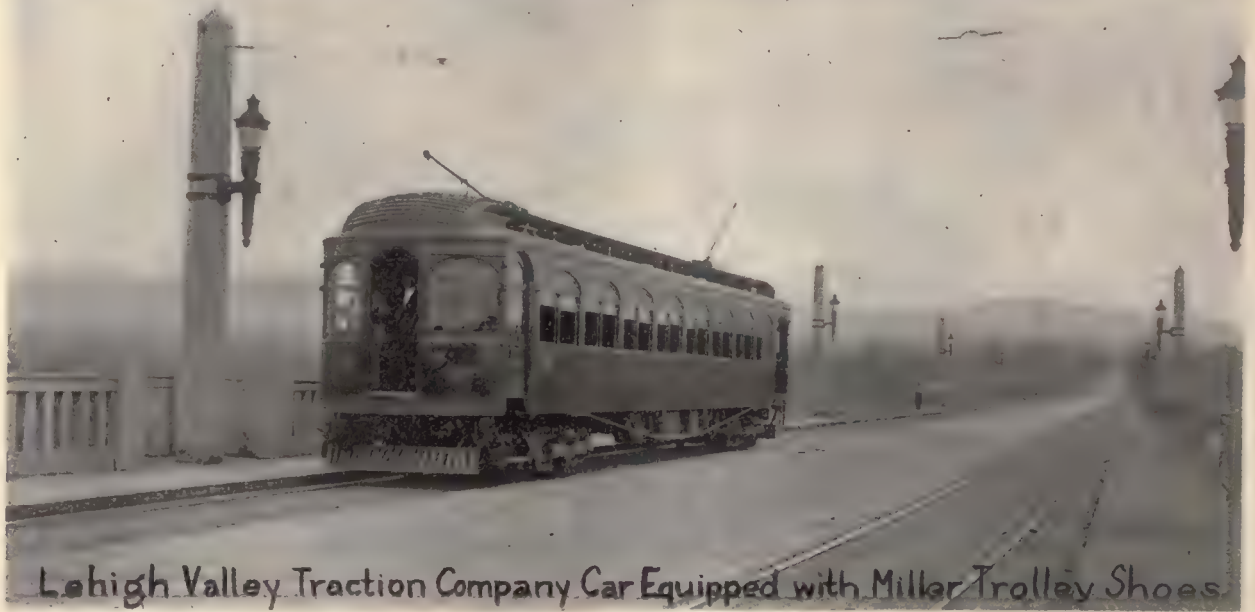
But there is a correct rate of feeding power to every car, a happy medium—not slow feeding—not "cannon ball" acceleration. Educating your motormen to employ this correct rate and to handle their brakes efficiently will pay big returns in power saving, reduced wear-and-tear on equipment, and reduced hazards of operation.

Install Sangamo Economy Meters on your cars and teach your motormen how to read them. They'll soon find out just what rate of acceleration and what percentage of coasting make for minimum energy consumption. An Economy Meter before a trained motorman is a check on his efficiency and a constant reminder of his responsibility.

Let us go into this problem with you. We have all the data ready to mail on receipt of your request. Write today.

**Sangamo Electric Company**  
 Springfield, Illinois  
 Meters for Every Electrical Need





Lehigh Valley Traction Company Car Equipped with Miller Trolley Shoes

## What Was Written About The Miller Trolley Shoe?

"The shoe has proven so satisfactory at this point that we consider it unwarranted to go after data at the present time, as all our past records have shown a splendid performance and a great economy."

### Who wrote it?

Harry Branson, Superintendent of Equipment, Lehigh Valley Transit Company.



### Why did he write it?

Because the shoes had averaged 10,000 miles, while many had run 15,000 to 18,000 miles, all on the famous Liberty Bell Route between Allentown and Norristown. And as to wear of the trolley wire? "Practically nil."

Want more details?

Write us!

**MILLER TROLLEY SHOE CO.**  
53 STATE STREET - - - - - BOSTON, MASS.

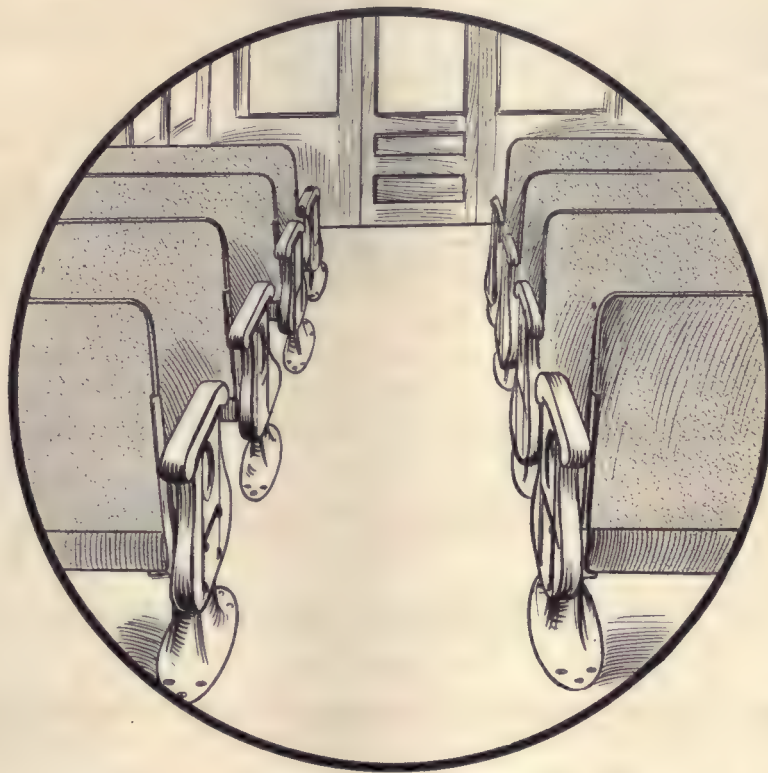
HOLDEN & WHITE, Chicago  
S. I. WAILES, Los Angeles, Cal.

SALES REPRESENTATIVES:  
F. F. BODLER, San Francisco, Cal.  
ALFRED CONNER, Denver, Col.  
W. M. McCLINTOCK, St. Paul, Minn.

W. F. McKENNEY, Portland, Oregon  
T. C. WHITE & CO., St. Louis, Mo.  
A. I. SANGER & SON, Cleveland, Ohio



# Like Soldiers at Drill



Is what you'll say when you look down an aisle flanked by the handsome pressed steel armrests of the Hale & Kilburn No. 199 AE interurban seat.

Of course, there's more to the armrest than its beautiful embossing and its mahogany capping. Its firmness, its rigidity will convince you that there is nothing flimsy in any part of a Hale & Kilburn seat.

## The Armrest of an Interurban Seat

Fulfills several purposes. It keeps the occupant within the limits of the seat and so prevents him from sprawling into the aisle; a still more important purpose is to save the rider from being thrown off the end of the seat at curves.

By giving due attention to the design of the armrest, we utilize every inch to the greatest advantage consistent with clear

ingress and egress of the inside passenger past the occupant who is alongside the aisle.

The No. 199 AE is often fitted with the Hale & Kilburn adjustable, single-rail footrest. Of course, it is also built with the famous Hale & Kilburn "Walkover" mechanism which makes reversing so easy.

This seat is used on many of the finest interurban cars. You'll like it, too!

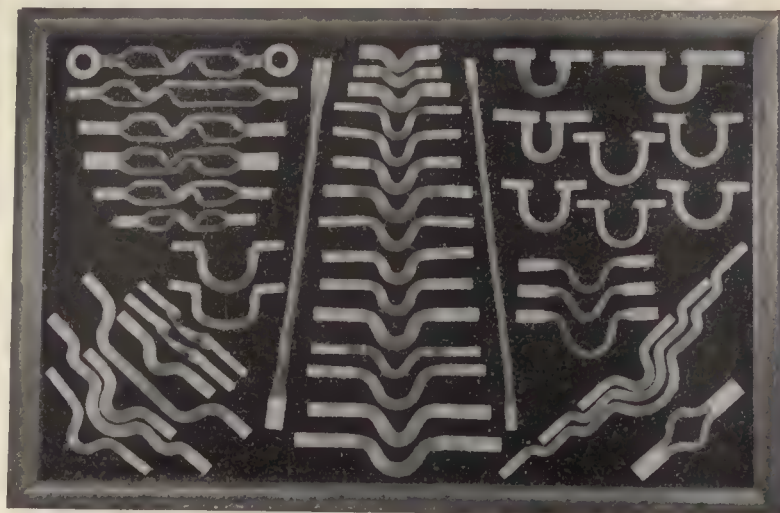


## Hale & Kilburn Co.

Philadelphia New York Chicago  
Washington San Francisco







There is no Shortage  
of  
**ERICO  
WELDED  
BONDS**

Just as the Erico Bond is making good its promises of service, so the organization behind the Erico Bond is making good its promises of delivery.

There is no shortage of Erico Bonds, despite the fact that thus far 1916 has been the best of the 16 years of Erico success.

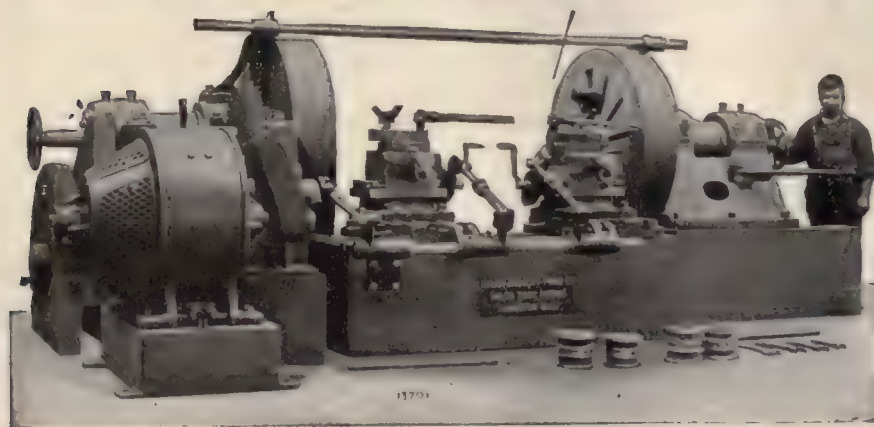
**Dependable Bonds—Prompt deliveries**

**The Electric Railway Improvement Co.**

Cleveland, Ohio

# Complete Machinery Equipment

For  
**Electric Railway  
Repair Shops**



**Car-Wheel Lathe**

The machine that will remove the flat spots, true up the wheels and return the cars to service in the shortest time. It is turning 12 to 18 pairs every day in several of the largest street railway shops. Provided with convenient calipering device, "Sure-Grip" drivers and patented tool clamps operated by a single screw.

Full line of high grade machines for the special requirements of such shops, as well as all types of standard machine tools, steam hammers and electric traveling cranes.

## Niles-Bement-Pond Co.

111 Broadway, New York City  
25 Victoria St., London, S. W.

**SALES OFFICES AND AGENCIES**—Boston: 93-95 Oliver St. **Philadelphia**: 405 N. 21st St. **Pittsburgh**: Frick Bldg. **Cleveland, O.**: The Niles Tool Works Co., 730 Superior Ave. **Hamilton, O.**: The Niles Tool Works Co. **Cincinnati**: The Niles Tool Works Co., 336 W. 4th St. **Detroit**: Kerr Machinery Bldg. **Chicago**: 571 W. Washington Blvd. **St. Louis**: 516 North Third St. **Birmingham, Ala.**: 2015 First Ave. **San Francisco**: 16 to 18 Fremont St. **For Colorado, Utah, Wyoming and New Mexico**: Hendrie & Bolthoff Mfg. & Supply Co., Denver. **For Seattle**: Hallidie Machinery Co. **For Canada**: The John Bertram & Sons Co., Ltd., Dundas, Montreal, Winnipeg, Vancouver.



# 4 Big Ones

that use

## PETER SMITH HOT WATER CAR HEATERS



Type "C" Magazine Hot Water Heater

Chicago & Milwaukee  
Electric  
Illinois Traction System  
Detroit United Railways  
Michigan Railway Co.

They use them because they are foresighted enough to figure "cost-in-the-long-run" instead of "first cost."

You'll find that Peter Smith Heaters always leave the field behind, when you figure that way.

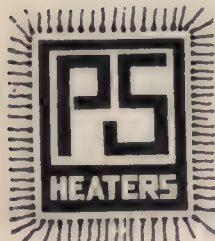
We're ready to furnish you with **any** of the accepted types: Hot water, forced ventilation hot air coal burning, forced ventilation electric, gravity type electric.

Let our experts figure with you on your requirements. They can save you lots of money.

**The Peter Smith Heater Co.**

Detroit, Mich.

*Heater Specialists for Thirty-five Years*





# G-E Carbon Brushes

## are the choice of discriminating buyers

The heavy sales of G-E carbon brushes are due almost entirely to their consistently high quality and absolute uniformity.

Such prominent railroads as the Hudson and Manhattan, New York Central, Connecticut Company and others have standardized on G-E Brushes and use no others.

Of uniform hardness and resistance and possessing exceptionally high conductivity, all shipments of G-E carbon brushes are alike, thus guaranteeing permanent satisfaction to regular users.

*They save wear  
on commutators*

## General Electric Company



Schenectady, N. Y.





# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, SEPTEMBER 16, 1916

No. 12

## NEATNESS AND GOOD WORK GO TOGETHER

That was a fine idea of the mechanical department of the Portland Railway, Light & Power Company to brighten up the shop grounds with flower beds and sod, as described by the master mechanic elsewhere in this issue. The man, and his name is legion, who likes a bit of flower garden by his own home, can work better in attractive surroundings at the shop or office. Because railway shop work is dirty and sometimes necessarily odorous there is no reason why the shop must be surrounded by junk heaps or desert. On every hand one sees the results of efforts to beautify ugly spaces and structures, yet there are many left to be thus treated. All that is needed is for some one to take the initiative, and he will find ready hands and open purses all about him. "And it must follow as the night the day" that the work in the shop will be better done as a result of the appeal which beauty and order make to the esthetic sense in all of us. It could not be otherwise than it was in Portland, where "there has been a noticeable change in the appearance of the interior of the buildings, the men seeming to take a greater pride in keeping the shops in a neat and orderly condition."

## WHO PAYS THE COST OF WASTED SALES EFFORT?

Aimless traveling on the part of manufacturers' representatives is about as productive of tangible results as a "nocturnal snipe hunting" expedition is in the Central West. It is expensive to the manufacturer and generally wastes the time of the railway officials who extend the usual business courtesies to these missionless emissaries. Either the expense of such traveling must be absorbed in the loading charge which is added to the cost of production, or it must reduce the profits of the manufacturer. On the other hand, manufacturers' representatives occasionally do not receive the usual business amenities, even when they respond to inquiries originating with railway officers. Calls which could be completed in a few minutes require the better part of a day. Whether the time is wasted by the manufacturer or the railway officer the cost in the end must be charged to railway operation. No manufacturer will continue to accept a profit reduced by a high sales cost, but he will add this expense to the cost of production. While it is equitable for the manufacturer to add the price of non-productive salesmanship to his cost of doing business, how much better it would be for the railway industry as a whole if the aimless traveling was obviated, and if the railway officers could be brought to appreciate that the time they cause a manufacturers'

representative to waste, only adds to the cost of operation. Conversely, there are well established ways of producing inquiries or arousing interest in a manufacturer's product without personal solicitation, and we will venture the assertion that the minimum amount of time is wasted by both the parties in question if the call is made in response to a direct inquiry.

## THE COMING ATLANTIC CITY CONVENTION

The publication of the program of the American Electric Railway Association convention in this issue of the ELECTRIC RAILWAY JOURNAL is a reminder of the approach of the fall season and its accompanying convention. The coming convention means more than any preceding one to the electric railway industry, because the difficulty of conducting transportation at a profit is greater than ever before. It will be of interest also as the first at which the entire program of meetings, entertainment and exhibits will be under the direct management of the American Association. The two dozen committee reports which have been already distributed in advance form are tangible evidence of a substantial year's work and lead one to expect a profitable discussion. The exhibit space contracted for to date, more than 54,000 sq. ft., and the number of exhibitors who will use this space, more than 125, are very satisfactory under the present conditions of business in this field. As was suggested in these columns last year the convention program may be expected to reflect the deepest thought of the industry. It is significant, therefore, that the American Association program provides primarily for the consideration of the relation of electric railways to military preparedness, two fundamental elements of valuation, and publicity. Generals Leonard A. Wood and Erasmus N. Weaver will present the first-named, a representative of the valuation committee the second, and Ivy L. Lee the third. Certainly no more timely topics of general concern could be selected. The accountants, also, are to have several papers which should appeal to many outside of their immediate circle. "The Statistician," by W. E. Jones, statistician the Connecticut Company; "The Federal Census of Electrical Industries," by William M. Steuart, statistician Bureau of the Census, and "Some National Issues in Local Street Railway Franchises," by Prof. Clyde L. King, University of Pennsylvania, are among these. Aside from the general papers mentioned, and a few on more technical subjects, the program is made up of committee reports, the consideration of which forms more and more the basis for substantial work at the conventions.



**WANTED—****NEW NAME FOR  
ONE-MAN CARS**

In spite of the assertion that a rose by any other name would smell as sweet, there is no doubt that the choice of a good name for any new device has a great deal to do with its future success. This is a time when advertising writers are studying what they call the psychological effect of the words which they employ, and they tell us that a great deal depends upon first impressions. The instance which we have in mind is the one-man car. This name conveys the chief thought back of the car very clearly to the railway man, but some railway managements have found the name a handicap in popularizing the car on their lines. To the public the characteristic of the car to feature is not its economical advantage but some other merit. For this reason, if the car bore a name which represented the benefit which the public would get from its introduction, it would probably be more popular. This benefit, of course, is the frequent service which a company can give with these cars on lines with light traffic as compared with those which require two men to operate them. Possibly the title "frequent service car" would answer. At any rate, there is in the minds of a number of managements a demand for a popular substitute for the name "one-man car."

**MAKING THE MOST OF SPECIAL TALENT**

There is an increasing tendency to-day to recognize that efficient engineering involves not only the most efficient and economical use of inanimate materials, but also of the human element. In manufacturing work, for instance, experts in scientific management, in many cases, have been enabled to effect large savings by a careful study of men and materials. The bulk of these studies, however, has been concerned with the men in the ranks rather than the men higher up. The plan described elsewhere in this issue evolved by one of the large holding companies for the better utilization of special talent among the men occupying the more important positions in the company is, therefore, of special interest. The fact that the traveling experts which this plan involves are operating men who, in their regular positions, are meeting all of the problems of operation, trivial or important, annoying or otherwise, seems to us of great importance. The selection of such men as traveling specialists removes the objection so often advanced against holding company experts, that they are not in close enough touch with the plain, every-day work of the operating man. Moreover, such appointments should help the men appointed, because the opportunity to inspect the work of others should broaden their perspective and thus make their own routine work easier and more interesting.

While, of course, most electric railway companies do not have the array of talent to draw upon that a large holding company has, we wonder if many companies are making the most efficient use possible of the special talent that they do possess. To illustrate, the superintendent of one division of an electric railway system has made a special study of car routing, let us say.

Should his knowledge of this subject be made of use to the entire system or confined largely to the work of his own division? While granting that there is now a certain amount of interchange of ideas among the men employed by the average railway company, we feel that far greater co-operation along such lines is possible.

**THE NEW YORK STRIKE**

Developments in the New York situation during the past week have been that the Amalgamated Association on Sunday declared a strike on the Third Avenue Railway in defiance of its written agreement with that company that all disputes were to be referred to arbitration, the gradual resumption during the past seven days of service on the surface lines, the hearing on the causes of the strike by the Public Service Commission and the uninterrupted operation during the week of trains on the subway and elevated systems. In fact, the subway and elevated systems have been carrying about 400,000 passengers a day more than during the same period last year, so that if the purpose of the union in calling out the men on the surface lines was to punish the Interborough Rapid Transit Company for its refusal to give in to them, the primary effect of their action has been to add about \$20,000 a day to its income. The Public Service Commission, whose chairman "underwrote" the original pact of Aug. 7, presented on Sept. 12 a memorandum in the case of the Interborough system and New York Railways suggesting that arbitration be used to determine whether the Interborough individual working contracts—given by the union as the cause of the strike on the Interborough and the New York Railways—constituted a breach of the agreement of Aug. 7, and whether these contracts were obtained by fraud, misrepresentation, coercion or intimidation. The hearing of the commission on the Third Avenue strike was not begun until Sept. 14, and no conclusions had been reached at the time this paper went to press. The suggestion of the commission for arbitration on the Interborough contracts was rejected by the managers of that company on the ground that its employees had shown what they thought of the Amalgamated Association by remaining at work. It is difficult to see how any other answer could be returned.

It should be remembered in these discussions that the Interborough Rapid Transit Company, operating the subway and elevated systems in New York, and the New York Railways, operating about 150 miles of surface lines, are entirely separate corporations, with different stockholders and different operating organizations, but with the same general management. The agreement of the Amalgamated Association made on Aug. 7 was with the New York Railways only, and provided for arbitration in the case of disputes. No contract was made by the Interborough Rapid Transit Company with the Amalgamated Association, and the company decided instead to deal directly with its various employees. That this policy was justified has been shown by the loyalty of these men during the past



week. Surrounded as they have been by men on strike urging them to leave their trains, this force, consisting of more than 10,000 men, have kept steadily on almost without exception, and have carried not only those who usually patronize these lines but the overflow from the surface lines as well. By their actions they have proved that they are satisfied with the individual form of contracts and have justified the claim of the management that this feature of their employment is not subject to arbitration.

The position of the Amalgamated as regards the Interborough is therefore not very cheerful, but in the case of the surface lines it is even more unenviable. The excuse given for the strike on the New York Railways before a request for arbitration was made, as provided in the agreement, was that the union leaders had heard that the company was considering the possibility of making individual contracts with its men, although they acknowledged that no such contracts had been made, so that the company had not broken its part of the agreement. With the Third Avenue Railway even less of an excuse has yet been brought forward. The feelings of the leader of the strikers seem to have been ruffled because the president of the Third Avenue Railway referred to him in a letter to Mayor Mitchel as Fitzgerald instead of "Mr." Fitzgerald, and there were vague suspicions on the part of the men that the union was not in good repute at the offices of the company, and that the company would be apt to follow any policy which was adopted by the New York Railways. Altogether, the results of the week in New York justify the position taken by the companies that they do not propose to have any more dealings with this association.

#### THE BURDEN OF WAGES

A number of electric railway companies, including some very big ones, have recently found it necessary to increase the wage scale by varying amounts, none of them inconsiderable and some of them large enough to constitute a serious burden from the standpoint of dividend earning. Few people stop to consider the small residual fraction of the passenger's nickel which is left when necessary charges have been deducted. A change of even a few cents an hour in the wages of conductors and motormen will absorb the possible profit of a good many passengers, hence a country-wide problem confronts the electric railway manager in the upward tendency of the wage scale. Very naturally, as has often been mentioned in these columns, the company has appealed to the commissions for much needed help with varying results. The rising expenses of every kind have perhaps made the call for more wages a justifiable one. Transportation, however, on electric railway lines is one of the few things which has had a downward tendency in price during the last decade or two, owing to increased service and length of haul, and it seems not unreasonable that this tendency should be at least checked if not reversed. The practical trouble comes in adjusting the method by which this desirable end shall be accomplished.

The purpose of this note is to call attention to the

desirability of a general concerted effort in some carefully selected direction on the belief that if the companies are united on a definite plan, or at least on a definite plan for each class of conditions, it will be easier to convince the public and the authorities of the desirability of higher fares. For city roads which present the most serious problem, three plans are open, namely, to curtail the transfer privileges, to adopt some sort of a zone system, and to add an extra cent to the nickel fare. The last expedient has not only the disadvantage of requiring two coins and the probability that the conductor will have to make change frequently, but also that it amounts to a straight increase of 20 per cent in earnings, except in so far as these are adversely affected on short hauls by such an increase, and a company has to come before its commission with a very clean record as to capitalization and great need in order to secure 20 per cent increase in net earnings. In some instances it has been accomplished, but it will probably be progressively more difficult to secure a 6-cent fare in city service.

Each company to a certain extent has its own problems to solve, but the analysis of the situation as it exists certainly suggests that cutting down transfers and careful modifications in the direction of zone systems furnish the best means of meeting the difficulty. There is no doubt whatever that many companies give transfers to an extent which is absolutely unnecessary from the standpoint of general public convenience and unfair so far as the transportation company is concerned.

An examination of the transfers on any large system shows that the number of preposterously long hauls given for a nickel is very considerable. To be sure some of the privileges extended are not utilized to any large extent, but others are employed to an amount which constitutes an abuse. Especially flagrant are the cases of the transfer of incoming passengers from one suburb to lines running in a similar direction to another. Rides of 15 miles or more for a nickel in these circumstances are not at all unusual, and the accumulation of statistics on the amount of this sort of unnecessary generosity if gathered together would make a formidable showing. Would it not be worth while to make a country-wide campaign for cutting down the maximum ride per unit fare to a more reasonable amount?

Probably even more effective in respect to earnings is a well organized zone system. Such a plan cannot well be carried out on the lines familiar abroad because the necessary corollary to a fully developed zone system would be a reduction of fare for the short hauls, which does not seem necessary. But the zone system with a minimum of 5 cents is in use in this country, as our readers know, with practically no collection inconveniences, and the extension of the system to one or two other cities would help greatly to popularize the idea as well as to demonstrate the extent to which it is generally applicable. This undoubtedly is one of the most important questions now before the industry, and one whose scientific study cannot be taken up too soon.



**1** Beaver Valley Traction Company  
CASH REGISTER REPORT  
Date.....191

**2** BEAVER VALLEY TRACTION CO.  
5:30 P. M. REPORT  
Date.....191

**3** Report of Cars Shopped  
Date.....191

**4** Beaver Valley Traction Company  
Day Shop and Barn Foreman's Report  
SUPPLEMENTARY  
Date.....191

**5** Armature No. ....  
CAR NO. ....  
Date Applied .....  
Date Removed .....  
Miles Allowed .....  
Cause of Removal .....  
Removal Date .....

**6** Beaver Valley Traction Company  
Day Shop and Barn Foreman's Report  
SUPPLEMENTARY  
Date.....191

**7** Beaver Valley Traction Company  
NIGHT BARN FOREMAN'S REPORT  
Date.....191

**8** THE BEAVER VALLEY TRACTION COMPANY  
STATEMENT OF OILS AND GREASE CONSUMED DURING MONTH OF  
Date.....191

**9** Car History Card  
Arm. No. ....  
Compressor No. ....  
Type .....

**10** Armature History Card  
CAR NO. ....  
Date Applied .....  
Date Removed .....  
Miles Allowed .....  
Cause of Removal .....  
Removal Date .....

**11** Wheel History Card  
WHEEL NO. ....  
Date Applied .....  
Date Removed .....  
Miles Allowed .....  
Cause of Removal .....  
Removal Date .....

Blank Forms Which Are Used for Rolling Stock Maintenance Records  
by the Beaver Valley Traction Company

- |  |   |                            |
|--|---|----------------------------|
| 1—Cash Register Report                   | 6—Supplemental Day Shop and Carhouse Foreman's Report | 9—Car History Card         |
| 2—5:30 p. m. Report                      | 7—Night Carhouse Foreman's Report                     | 10—Armature History Card   |
| 3—Cars Shopped Report                    | 8—Monthly Oil and Grease Report                       | 11—Wheel History Card      |
| 4—Day Shop and Carhouse Foreman's Report |   | 12—Axle History Card       |
| 5—Armature Due Card                      |   | 13—Compressor History Card |



# Complete Records Help to Offset the Rising Cost of Labor and Material

Rolling Stock Maintenance Cost Can Be Materially Reduced by a Record System, Which Accurately Checks Up the Work of the Employees as Well as the Performance of the Apparatus

By W. H. BOYCE

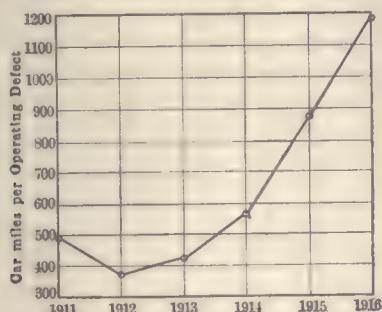
Superintendent Beaver Valley Traction Company, New Brighton, Pa.

IN the successful operation of any manufacturing concern detail reports are an absolute necessity. The same principle holds good in the proper maintenance of electric railway lines. Through the complete system of reports used in all departments of the Beaver Valley Traction Company, New Brighton, Pa., it is possible at any time to secure accurate and intelligible information as to the condition of the rolling stock and other equipment. Certain employees are held responsible for the making out of these reports and the rules governing them are strictly followed.

Our experience has proved that even in a property of this size, records of all kinds, and systems in all departments are profitable. One might think that on a road operating twenty-three to twenty-five regular cars

midnight is sent to the night cashier who checks it with the register closing statements on the conductor's reports.

The 5.30 p. m. report, Fig. 2, shows the number of cars in the carhouse at the time the report is made out, the number of cars not ready for service and the causes of their disability. One object of the report is to keep the day men on the job and reduce as far as possible the number of crippled cars which the day men leave for the night men to take care of. The report is made

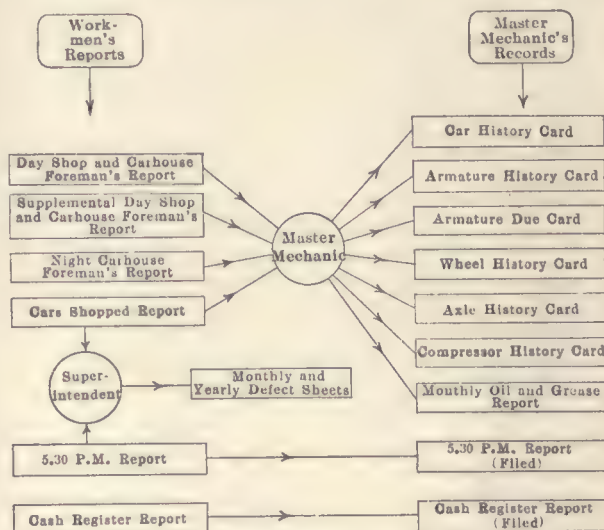


CURVE SHOWING CAR-MILES PER OPERATING DEFECT

there would not be much demand for the number of records which are kept relative to the rolling stock, but a glance at the curve showing car-miles per operating defect for the past six years will readily disprove this. With the rising cost of labor and materials the management of a property should at any time be able to determine from the records the comparative cost per 1000 car-miles of even as small a thing as a trolley wheel.

The illustration on the opposite page shows the forms on which our car maintenance records are kept and the diagram indicates how the data from the workmen's reports are transferred in the master mechanic's office to the several history cards. Copies of two of these reports also go to the superintendent's office where the monthly and yearly defect sheets are compiled. An outline of the work covered by each report follows:

The cash register report, Fig. 1, shows the car number and cash register reading of each car in the carhouse when the day carhouse inspector comes on duty and the same data for each car turned in from operation during the day. The report is begun by the day carhouse inspector and finished by the night inspector and is filed in the master mechanic's office. A separate cash register report of the cars turned into the carhouse at



METHOD OF KEEPING CAR MAINTENANCE RECORDS BEAVER VALLEY TRACTION COMPANY

in duplicate, one copy for the master mechanic and another for the superintendent.

The number of crippled cars turned in from service and the cause of the failure of each car are recorded on the report of cars shipped, Fig. 3. This is one of the most vital reports since it indicates the condition of the equipment by showing the failures and troubles of the cars in service. The superintendent receives a copy of this report and in his office the data are transferred to the monthly and yearly defect sheets. The master mechanic also receives a copy and transfers the data to the history cards.

The armatures, axles, etc., which are replaced during the day are recorded on the day shop and carhouse foreman's report, Fig. 4, which is filed in the master mechanic's office where the data are transferred to the history cards. Motor armatures are removed periodically on a mileage basis, 12,000 miles being allowed for a GE-54 armature, 15,000 miles for a GE-67, etc. For keeping a record to show when an armature should be removed the armature due cards, Fig. 5, are used, the information being taken from the day shop and carhouse



foreman's report. In determining when an armature should be removed we allow about 170 miles per day which takes into account the fact that the cars are left in the carhouse periodically for cleaning.

The supplementary day shop and carhouse foreman's report, Fig. 6, covers the miscellaneous shop work which is noted on the form. The data from these reports are transferred to the respective car history, armature history or other cards. The inspection, oiling and cleaning which is done at night is recorded on the night carhouse foreman's report, Fig. 7, and transferred from there to the respective history cards. The master mechanic keeps account of all lubricant used and records it on the monthly oil report, Fig. 8. The history cards to which reference has already been made are shown in Figs. 9 to 13 inclusive. The data from the various workmen's reports, described above, are transferred to these cards which form a permanent record in the master mechanic's office. These history cards thus show the operating record of the apparatus and the amount of repairs that have been necessary.

#### SHOP PRACTICE

In connection with the record blanks which have just been described, a brief outline of some of our shop practices may be of interest. The Westinghouse-328 motors are inspected every 600 miles or every third night, and all other motors are inspected every night. The air gaps are gaged with a hack-saw blade with the teeth ground off, or with a 1/32-in. sheet of fiber cut in a long strip. The motors are examined for the usual defects and the brushes and holders are inspected. The armature bearings are oiled every night and the axle bearings every other night. The latter are removed if they show a diametrical wear of over 1/8 in. The steel wheels are removed when the limit of wear gage, 5/8 in. in width, will slip down over the flange of the wheel. In cases where the tread of the wheel is less than 5/8 in. from the radial limit of wear line the flange is allowed to wear down as small as 1/2 in.

Four single-truck and two double-truck cars are cleaned on the interior each day and two single and one double-truck car are scrubbed thoroughly each day, the windows and outside of the car being cleaned when the cars are scrubbed. At night car cleaners sprinkle the floors of all cars with a disinfectant and then sweep them thoroughly.

Once every month each car is inspected from the trolley wheel to the rail. This has been the means of finding many small defects and thus preventing delays and more costly repairs. At this time the journal boxes are oiled and repacked, and we have found more frequent attention unnecessary. The air compressors are also inspected and filled with oil once a month. The amount of oil used is recorded on the compressor history card, a glance at which at once shows if the consumption is irregular.

In the summer season the aluminum lightning arresters on the cars are inspected after each storm by pulling off the trolley wheel and letting it make contact again. A sharp, snappy spark indicates that the arrester is in proper working condition. Every two weeks the night carhouse foreman inspects all aluminum cell arresters to see that they are properly filled and that they are not heating.

Work has been commenced on a new narrow-gauge railway to connect Motril and Ordiva, Spain. It is probable that when this railway is completed the tramway company at Granada will open a new tramway line between Granada and Ordiva, thus bringing the port of Motril within easy reach of Granada.

## Signal Lights to Be Changed on the Pennsylvania System

White Lights for Proceed Signals to Be Replaced by Green Lights

WHITE lights are to be eliminated altogether as a signal indication on the entire Pennsylvania Railroad system, both east and west of Pittsburgh, Pa., as soon as the materials to make the necessary changes can be obtained. Green lights will replace white lights for "clear" or "proceed" signals while a bright distinctive yellow light visible at great distances will be used for a "caution" signal. A red light will continue to be a "stop" signal. The elimination of white from the signal color scheme has been rendered desirable by the increasing use of white lights of various kinds in buildings, driveways, roads and streets close or adjacent to the railroad's right-of-way.

This company, however, was unwilling to proceed with the change until a yellow glass could be obtained for the "caution" signal which would give a bright light at long distances. A light was desired which would not be liable to be mistaken for white, and thus be confused with other lights along the line of the railroad. Progress in the art of coloring glass, after years of experiments, has resulted in the production of such glass.

The adoption of the new signal system will mean the changing of hundreds of thousands of colored glasses and lanterns. This will require considerable time for completion, especially as slow deliveries are to be expected owing to industrial conditions resulting from the European war. Not only will alterations have to be made in all of the semaphore signals, but the following devices will also be affected: Marker lights on the rear of passenger and freight trains, switch lamps and targets, markers for track tanks, slow signs, resume speed signs, hand lamps at interlocking and block signal stations and lights displayed at crossing gates. Lights for the latter purposes will be red instead of green as at present.

This proposed signal system has been tried out on the extreme end of the New York division and has been found to work satisfactorily. It has also been adopted by branch lines of the Pennsylvania system so that desirable uniformity will be obtained. No change is to be made on those short portions of the system which are protected by "position light" signals in which the various indications are given by rows of electric lights showing against a black background in the various positions of the semaphore arms.

## Louisville Railway's Interest in Factory Fund

The Louisville (Ky.) Railway Company will ultimately be one of the principal individual beneficiaries of the "million dollar factory fund" which Louisville succeeded in raising by a nine-day campaign which closed recently. The railway company, with a subscription of \$25,000, was one of the largest subscribers, the only other similar subscription having been made by the Louisville Gas & Electric Company. Subscriptions announced at the close of the campaign were several thousand dollars over the million set out for, while there are still other additions to be made. Payments will be made in ten equal semi-annual installments, and the fund will constitute the capital of the Louisville Industrial Foundation, Inc., an adjunct of the Board of Trade. The organization of the corporation will begin at once, after which an industrial survey of the city will be made.



# Unballasted Track Gives 50 Per Cent Lower Maintenance Cost

By WILLIAM S. TWINING

Director Department of City Transit,  
City of Philadelphia

*The author of this article was chief engineer of the Rapid Transit System in Philadelphia at the time that the subway in that city was constructed, and it was under his direction that the novel method of track construction there adopted was employed. It is interesting to learn that during nearly ten years' of service very few renewals have been found to be necessary and that no defects have developed which would suggest any desirable changes in the methods of construction.*



PHILADELPHIA SUBWAY TRACK—VIEW SHOWING FOUR-TRACK TUNNEL

**A**T the time of the installation of the track in the Philadelphia (Pa.) subway in 1907 there was a great deal of interest manifested in the work owing to the fact that a new type of construction was installed. After nearly ten years of severe use this construction has given an excellent service record. Accordingly, the figures given below, showing the total yearly cost of this track construction as compared with the cost of ballasted track subjected to same service, are of value and interest.

The installation of track was described in the *STREET RAILWAY JOURNAL* in the issue of Feb. 16, 1907, and further details were given in the issue of May 4, 1907, but for the benefit of those unfamiliar with this type of roadbed a brief description follows:

The construction comprises two 12-in. 20½-lb. channels under each rail, the channels being spaced 15 in. back to back, with two 15-in. 33-lb. channels as permanent spacers. This steel work is assembled in the shop in 30-ft. lengths, then placed in position in the subway and accurately surfaced and aligned by attaching the rail thereto with temporary long ties spaced at intervals of about 15 ft. The channels are then

embedded in concrete to the height shown on the accompanying illustrations. The concrete is brought to a true plane about ⅛ in. above the channel flanges to afford a bed for the ties. The ties are 6 in. x 10 in. x 2 ft. yellow pine, surfaced to precise thickness and placed on the concrete at intervals of 2 ft. They are anchored to the channels by ¾-in. x 8-in. bolts passing through the ties (head up), the holes for this purpose having been previously provided in the flanges of the channels. After the ties are in place the rails are accurately aligned and fastened to the ties by means of screw spikes and cast-iron clips. The rails used are 90-lb. A. S. C. E. Bessemer steel in 60-ft. lengths. The carbon content is about 0.55 per cent.

The first section of track was placed in operation in February, 1907, and has been in continuous use since that date, or about nine and one-half years. The same rail and construction throughout as originally placed is still in service with the exception of the rail on curves, and probably the rail on tangents will have a life of about a year and a half more. During this period approximately 3,500,000 cars have used the track, or a tonnage approximating 140,000,000.



The tracks on the Market Street elevated line immediately to the west of the subway were laid at the same time with precisely the same type of rail and similar joint plates. The elevated construction consists of 6-in. x 8-in. x 8-ft. ties on stone ballast with a depth of 5 in. to 8 in. beneath the ties. The rail on the elevated structure was in such condition in 1912 as to demand renewal throughout the entire section between Twenty-ninth and Sixty-third Streets. This was done late in 1912 and early in 1913, after a life of six years, and during 1912 and 1913 the greater part of the ties were likewise renewed.

As there is no ballasted construction on any of the subway tracks in this city, the nearest approach to a comparison of maintenance cost between the subway type of construction and the ballasted type is a com-

parison of the subway with the section of the elevated above noted, both sections having been subjected to precisely the same amount of traffic. They are constructed with rail of the same weight and quality, and the same type of joint plates and method of fastening rails to ties.

An analysis of the expenditures running through several years, after eliminating such charges as would be common to any type of construction, indicates a maintenance cost for the subway track of about one-half that of the ballasted track, or approximately \$528 per mile per year for the subway track as against \$1,056 for the elevated ballasted track.

The initial cost of concrete construction is estimated at \$44,352 per mile, and the ballasted construction \$24,288 per mile. In the ballasted construction the cost



Philadelphia Subway Track—Views Showing the Four Steps Followed in Laying Rails

Each rail is mounted on a series of wooden blocks which are held in position by  $\frac{3}{4}$ -in. bolts passing through the blocks and the upper flanges of two 15-in. channels. The channels are spaced 15 in. apart by separators, and the space between them is filled with concrete so that the wooden blocks rest directly on the concrete. No ballast of any kind is used, so that the subway is very easy to keep clean.



of a concrete sub-base under the ballast has been included. Basing an estimate on past experience we have placed the life of the rail in the concrete construction at ten years and in the ballasted construction at six years. As to the ties, we have no definite information as to how long untreated ties will last in the subway. The present ties are in first-class condition after nearly ten years of service, and for the sake of comparison we have placed the life at fifteen years, and the life of the ties in the ballasted construction at eight years. In both cases, of course, the timber is untreated. Basing estimates on these figures the results are, in round numbers, as follows:

Concrete Construction	
Interest on initial cost (\$44,352 at 5 per cent).....	\$2,218.00
Sinking fund for tie renewals (\$4,224 in fifteen years)...	192.00
Sinking fund for rail renewals (\$6,336 in ten years)....	496.00
Maintenance .....	528.00
Total yearly cost per mile.....	\$3,434.00
Ballasted Construction	
Interest on initial cost (\$24,288 at 5 per cent).....	\$1,214.00
Sinking fund for tie renewals (\$5,808 in eight years)...	600.00
Sinking fund for rail renewals (\$6,336 in six years)....	918.00
Maintenance .....	1,056.00
Total yearly cost per mile.....	\$3,788.00

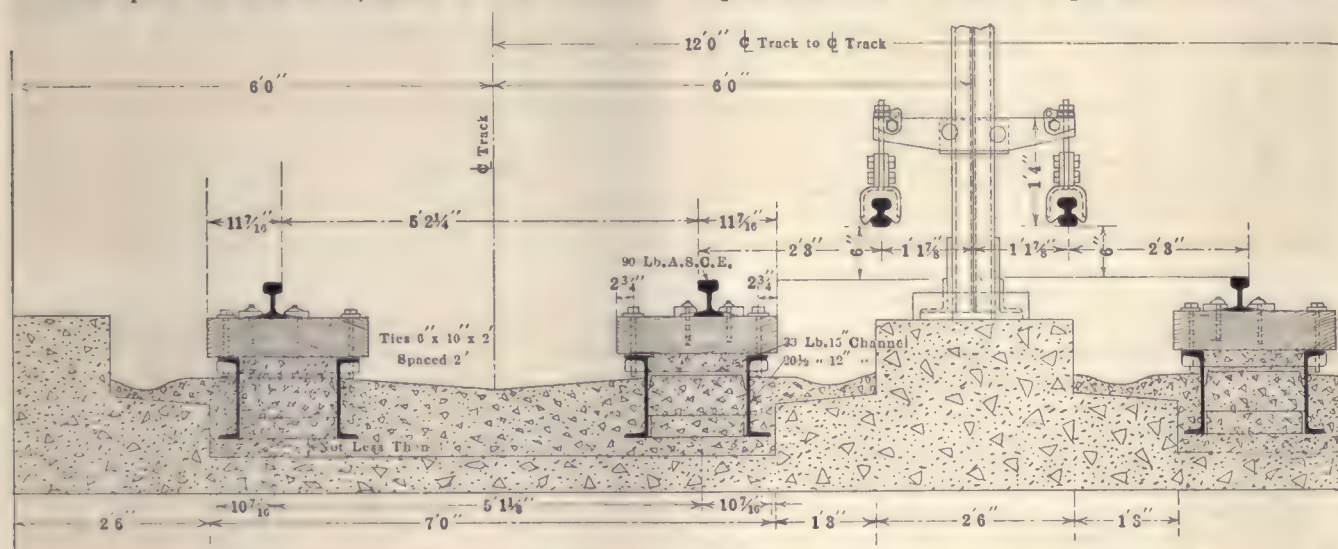
There is therefore a difference of \$354 per mile per year, or about 9 per cent, in favor of the concrete construction. In making this comparison, no reference has been made to the fact that the channels in the concrete construction provide steel of a cross-section of about 26 sq. in. for each track, which is used for return

with a permanent substructure, to avoid the continuous and expensive maintenance due to ordinary ballasted construction, especially as such work would be required in the limited confines of the subway; to avoid vitiation of the subway air by the accumulation of foreign materials which could not readily be removed, and to make all wearable portions easily accessible for inspection and replacement with a minimum amount of labor and the least possible interference with traffic. After nearly ten years of service there is no hesitancy in saying that our aims have been fully realized, and in addition to a reduced maintenance expense a substantially greater life has been secured in the wearable portions.

The actual maintenance work so far performed in the subway aside from the inspection and the replacement of the rail on curves, has been the renewal of a comparatively small number of the short ties and the changing of a few tie bolts and screw spikes which had broken, probably from being set up too tightly. It is readily seen from the drawing that such renewals can be made with two or three men, as each bolt or each tie can be removed and replaced independently of any other.

There is ample room between rails for the storage of any material required for repairs or renewals, and practically no interference with traffic is necessary except, perhaps, single tracking for very short intervals during the period of rail replacements. A few hours at a time during "owl" car service will suffice for this operation.

The cleanliness of the subway is, of course, a very important feature. The floor is practically a granolithic



TYPICAL CROSS-SECTION OF PHILADELPHIA SUBWAY SHOWING UNBALLASTED TRACK CONSTRUCTION

current purposes, in addition to the 18 sq. in. in the rails. The cost of return cable of an equivalent carrying capacity is thus saved.

It must be borne in mind also that the larger part of the repair work required on the elevated is performed in daylight, whereas the subway work is all performed under artificial light with the usual disadvantages incident to such work. Furthermore, a large proportion of the expenditure on the subway track was virtually inspection work, consisting largely of going over the bolts and screw spikes at frequent intervals to make sure that all were in good condition and to detect any weaknesses incident to a type of construction which had not been previously tried. With these facts in mind it may be safe to say that the difference between the maintenance cost of the concrete construction and the ballasted construction would be considerably more than as indicated above.

The object of the designers was to provide a track

surface, which can be cleaned either by flushing with water or sweeping with ordinary house brooms, both of which methods have been used effectively and to such an extent that absolutely no foreign matter of any description has been allowed to remain. The track without at station platforms is swept up each night down the city. traffic, and the other portions of the subway are swept at frequent intervals.

Finally it may be said that the ten years of experience with this construction have not indicated any defects that would suggest any desirable change in the method of construction. Some time ago it was suggested that should such construction be installed in a subway where the conditions of water to moisture would tend to cause rapid corrosion of the exposed face of the channel, it might be desirable to construct a special channel with a depressed flange so as to have the anchoring flange entirely surrounded by concrete. The need of this has not so far been disclosed by our experience.



# Employees Repudiate Peace Pact

Third Avenue and Second Avenue men in New York City Disregard Settlement Plan of Aug. 7 and Strike Without Arbitration—Commission Recommends that Interborough Arbitrate Service Contract, but Company Refuses—Service on All Lines Increasing

THE strike situation confronting the Interborough Rapid Transit Company and the New York Railways, which seemed well in hand when this paper was published last week, was made more serious on Saturday night, Sept. 9, by the extension of the strike to two lines not at all concerned, the Third Avenue Railway and the Second Avenue Railroad, and in spite of supposedly sacred agreements entered into by the men on these lines to arbitrate all grievances. In spite of this repudiation of the settlement pact of Aug. 7, however, the companies involved proceeded to offer increasingly good service. The trunk subway and elevated lines of the Interborough Rapid Transit Company offered more than normal service, and the affected surface lines showed improvement daily. At present the fight seems won by the companies, although the union leaders are threatening to call a general sympathetic strike of trade unionists in order to strengthen the car men's failing cause.

## STRIKE SPREADS TO SECOND AND THIRD AVENUE LINES

The strike of electric railway employees in New York City that was initiated on the subway and elevated lines of the Interborough Rapid Transit Company and the surface lines of the New York Railways on Wednesday evening, Sept. 6, was extended on Saturday evening, Sept. 9, to the surface lines of the Third Avenue Railway and the Second Avenue Railroad. During the day the Public Service Commission for the First District exerted every effort to hold the employees on these lines to the settlement plan of Aug. 7, but to no avail.

The new strikes went into effect immediately, and on Sunday morning, Sept. 10, the residents of Manhattan awoke to a realization that the most complete transportation tie-up in its recent history was in existence. Early in the morning the situation was made more serious by similar strikes called on the Union Railway, the Bronx subsidiary of the Third Avenue Railway, and on the Yonkers Railroad and the Westchester Electric Railroad, subsidiaries in Westchester County of the Third Avenue Railway. Thus, for the major part, the peace settlement of Aug. 7 had proved a failure, for all the surface lines in Manhattan and the Bronx were again in the throes of a strike. Only the employees of the New York & Queens County Railway in the Borough of Queens and the Richmond Light & Railroad Company in the Borough of Richmond, which also came under the Aug. 7 settlement, remained loyal to the peace agreement and, with the still unaffected employees of the Brooklyn Rapid Transit Company and the non-striking employees of the Interborough Rapid Transit Company, continued to offer their services to the people of New York City.

## HOW THE PEACE SETTLEMENT WAS VIOLATED

The strikes on the large Third Avenue Railway system and on the small Second Avenue Railroad were not the result of specific demands made by the union under the settlement plan and refused by the companies, but rather were walk-outs in sympathy with the strikes on the Interborough Rapid Transit Company and the New York Railways. Indeed, at a strike hearing before the Public Service Commission on Thursday, Sept. 7, William B. Fitzgerald, union organizer, had testified that a

skeleton form of working agreement had been worked up for the Third Avenue Railway and was then the subject of conferences, and that as far as he knew peace and harmony prevailed and the method provided on Aug. 7 for adjusting differences in dispute was working satisfactorily.

According to a letter sent to Mayor Mitchel on Saturday, Sept. 9, by F. W. Whitridge, president Third Avenue Railway, the company had been considering in conference twenty-six demands of the union, and at the last conference, on Wednesday, Sept. 6, the company understood that it would receive in forty-eight hours a statement from the men as to what they were prepared to do. Up to Saturday nothing had been heard from them. The company, however, was ready to go ahead with arbitration with the least possible delay, and it had secured the consent of Lindley M. Garrison, former secretary of war, to act as its representative in the expected arbitration proceedings. Since Mayor Mitchel was one of the underwriters of the Aug. 7 agreement, therefore, Mr. Whitridge asked him on Sept. 9 to have the men nominate their arbitrator forthwith and also to fix some date within the next few days when if the men should not have named their representative, the Third Avenue Railway would in the Mayor's opinion be justified in considering that the men wished to abrogate their agreement.

The only answer to this letter on the part of the men was, as before stated, a strike late in the same evening. It was asserted by the union leaders that the sequence of events in regard to signing the Aug. 7 agreement and in regard to reinstating employees convicted of crime in the first New York strike a month ago showed that there was collusion between the traction lines of the city in an effort to destroy unionism, that the Third Avenue Railway in all cases was following the lead of the New York Railways and that it was only a question of time before the individual working agreements, which led to the trouble on the Interborough Rapid Transit Company and the New York Railways, would be circulated among Third Avenue Railway employees.

## A FIGHT TO THE FINISH DECLARED

Before describing in detail the way in which the various transportation lines in New York were able to offer service to the public during the last week, it will probably be well to note the general moves in the whole strike situation up to the time of writing. After the union by its extension of strike orders to the Second Avenue and Third Avenue lines had showed that it did not intend to be bound by its agreement of Aug. 7, the traction officials of the city declared war in earnest on the Amalgamated Association. Collusion between the companies was denied, and it was pointed out that no individual working agreements had been circulated on the Third Avenue and Second Avenue lines. T. P. Shonts, president New York Railways, stated that it must now be apparent to everyone that it did no good to sign agreements with the Amalgamated Association and that there would be a fight to the finish. Mr. Shonts complained that some strikers were trying to intimidate loyal employees through the wives of the latter, and said that he was determined to stop this practice. Ac-



cordingly, as shown in the accompany reproduction, the New York Railways put up posters offering a reward of \$200 for evidence resulting in the arrest and conviction of any person who made to any female member of an employee's family any threat of personal violence toward such an employee or any member of his family for the purpose of intimidating him from the proper discharge of his duty. A similar offer was made by Mr. Shonts as president of the Interborough Rapid Transit Company.

President Whitridge after the Third Avenue strike order stated in a letter to Mayor Mitchel that the act of the union was obviously a breach of the agreement of Aug. 7, and that the striking employees had apparently spoken and behaved not as parties to a contract but as members of a secret society bound to obey the orders of a master. Accordingly, he accepted the men's repudiation of the Aug. 7 agreement, and would treat it thereafter as non-existent. As for the future, Mr. Whitridge said, no member of the Amalgamated Association would be employed on any of the lines over which he had jurisdiction, for the association had proved to be "a humbug." It was of no benefit to its members except the few who were officers, and it promoted disorder and disloyalty and was rapidly becoming a public nuisance. Mr. Whitridge emphatically stated in conclusion, in his letter to the Mayor, that he would have no dealings with the Amalgamated Association or with any one representing it until it was incorporated under New York laws and its accounts placed under the supervision of the Public Service Commission.

#### INTERBOROUGH NOT FIGHTING UNIONISM

In reply to a charge made on Monday, Sept. 11, by Mr. Fitzgerald to the effect that the companies had deliberately determined to crush unionism in New York, President Shonts and General Manager Hedley on the same day issued to the public an unqualified denial. The complete statement is shown in the illustration on the next page. The fact was, these officials said, the Interborough company had actually encouraged the formation of a union, to be entirely controlled by the men themselves and to include every employee on the payrolls not having disciplinary power over other employees. In short, the men of the company had an effective union of their own which was obviously satisfactory to them, and the real point underlying the existing difficulty was the determination of the Amalgamated Association to impose itself upon the company and to supplant the Brotherhood of Interborough Employees against the expressed will of the men themselves.

#### GENERAL SYMPATHETIC STRIKE AND OTHER AIDS SOUGHT BY UNION

As the week progressed, the outlook for the striking employees of the various lines gradually grew less rosy than they had expected, and various movements were instigated to strengthen their cause. The first of these was on Sunday night, Sept. 10, when delegates representing the American Federation of Labor, the New York State Federation of Labor, the Central Federated Union of New York and the Brooklyn Central Labor Union recommended a general sympathetic strike of the 750,000 trade unionists in the city in support of the Amalgamated Association. The leaders voted for this action on the ground that the right of organization was at stake. The action by the delegates was taken after Samuel Gompers, who had come to New York, had left the conference and had issued a statement saying that he favored all unions giving their moral and financial support to the car strikers, but not mentioning a sympathetic strike.

Although the threat of a general sympathetic strike in the city was at first received with forebodings by the

public, events throughout the week tended to cause the belief that such a strike was for the most part only "talk." First it was explained that before a general sympathetic strike could be called, definite action would have to be taken separately by the individual unions composing the central bodies, which would require a week's time. Then, on Monday, Sept. 11, the chairman of the conference committee of delegates announced that in the event of a sympathetic strike, only those unions would be involved whose members were directly concerned with electric railway operation, such as stationary engineers and firemen, longshoremen who handle fuel for the railways, and power-house employees. This would reduce the number of new strikers from 750,000 to not more than 70,000. At this writing no definite

## New York Railways Company

New York, Sept. 9th, 1916

# \$200 REWARD

A reward of \$200 will be paid for evidence resulting in the arrest and conviction of any person who makes to any wife, mother or other female member of the family of any employee, any threat of personal violence towards such employee or any member of his family for the purpose of intimidating him from the proper discharge of his duty.

NEW YORK RAILWAYS COMPANY  
By FRANK HEDLEY,  
Vice-President & General Manager

Approved:

THEODORE P. SHONTS,  
President

NEW YORK STRIKES—TYPE OF REWARD NOTICE PUT OUT BY NEW YORK RAILWAYS AND INTERBOROUGH RAPID TRANSIT COMPANY

strike action by even any of these has been taken, although there are threats of developments next Monday.

Another effort to cripple the companies in their efforts to offer service in spite of the strikes was seen in the offering of four experience ordinances on Tuesday, Sept. 12, to the Board of Aldermen. One, a fair sample, provided, under a penalty of \$150 fine or six months' imprisonment or both, that no motorman or conductor should be allowed on any city lines without fifteen days' experience on some similar line in the city. The various resolutions were all referred to the general welfare committee, where it is expected they will remain. Still later reports, made on Wednesday, Sept. 13, were to the effect that recourse would be had to the State legislature for a compulsory arbitration law, and that the Board of Estimate and Apportionment would favorably consider a motor-bus franchise which has been before it for more than a year. It was denied, however, that the city authorities had any intention of using such means of reaching a strike settlement.

#### COMMISSION URGES USE OF ARBITRATION

In the meantime the Public Service Commission had been continuing its hearings of the prior week in the



matter of the Interborough and New York Railways strike situation, with Mayor Mitchel as one of the underwriters of the Aug. 7 settlement sitting with Chairman Straus, the other. As a result of the investigation into the causes and the parties at fault for the strike situation, the Mayor and the commission on Tuesday, Sept. 12, handed down a memorandum recommending that the Interborough and New York Railways strikes be called off immediately and that the negotiations between the companies and the men be taken up again at the point where they were dropped before the strikes began. Asserting that the rights of the public are superior to the rights of either the strikers or the company, the commission proposed that both sides submit to arbitration the questions as to whether the individual working agreements constituted a breach of the peace pact of Aug. 7 and whether fraud, misrepresentation, coercion or intimidation was used by the company in obtaining such contracts. Furthermore, in order that the parties might proceed with the conferences where left off and that friction might be avoided, the commission suggested that they agree upon some impartial person to preside or, if they could not do that, permit the Mayor and Chairman Straus to name such an impartial person, to have no authority in reaching a decision, but merely to preserve the parties from further misunderstandings and disagreements. Finally, the commission advised that all such conferences should be held in public.

In reaching a decision embodying the foregoing recommendations, the commission was actuated by reasons stated in its memorandum, in part as follows:

## To the Public

Let no one be misled by the charge that the Interborough is trying to crush out unionism.

### WE ARE NOT FIGHTING UNIONISM.

The fact is that the Company actually encouraged the formation of a union, to be entirely controlled by the men themselves and to include every employee on the payroll not having disciplinary power over other employees.

The fundamental ideas of the Company in encouraging the formation of such an organization were:

1. That the men in their dealings with the Company should enjoy the benefits of collective action without expense;
2. That the public should be protected against sympathetic strikes arising out of disputes in which this Company and its employees were not concerned;
3. That more efficient service to the public would result if the relations between this Company and its men collectively were conducted within the Company's ranks and without the interference of third parties;
4. That the interests of this Company, its employees and the public they serve, would be fostered if all relations between this Company and its employees were conducted solely in the light of their common interests, rather than with reference to the interest of outside parties.

Some 9,700 men out of 11,800 eligible to vote embraced the opportunity to ballot for representatives to form a general committee of this union.

A working agreement was arrived at between the Company and this Union providing increased wages and improved working conditions for the next two years.

This was a "collective bargain" just as much as any union agreement is.

But the Company went one step further: it not only agreed to a contract with the men collectively, but it asked that the agreement also be submitted to each man individually.

That it was satisfactory to the men individually as well as collectively is shown by the fact that over 10,500 have signed and are now working under it.

An important feature of the Interborough Union is this provision for arbitration in the constitution adopted by the men, and unanimously approved by formal action of the Board of Directors of this Company:

"If for any reason the General Committee for the entire Brotherhood and the Officers of the Company are unable to settle any matter of mutual interest between them,—it is then the plain duty of the Brotherhood and the Officers of the Company to submit the matter in dispute to a Board of Arbitration."

Thus the men of the Interborough have an effective union of their own which is obviously satisfactory to them.

The real point underlying the existing difficulty is the determination of the Amalgamated Union to impose itself upon the Company, and to supplant the union of the Interborough employees, against the expressed will of the men themselves.

This Company is only protecting its employees in their right to work and the public in its right to ride as against the efforts of the Amalgamated Association to prevent the doing of these two things.

INTERBOROUGH RAPID TRANSIT COMPANY.

FRANK HEDLEY,  
Vice-President & General Manager.

Approved:  
THEODORE P. SHONTS.

President

New York, September 11th 1916.

"On Aug. 10, when the commission filed its memorandum on the former strike, there was no agreement covering the subways and the elevated. On Aug. 30, it appears from the testimony before us, the Interborough Rapid Transit Company received a committee of its union men, attended by the same advisers and spokesmen who appeared before us in the matter of the other railways. After discussion, Mr. Hedley informed Mr. Fitzgerald and his associates that as the same men governed the policies of the Interborough system as governed the policies of the New York Railways, they might proceed upon the assumption that the principles and policies embodied in the New York Railways agreement of Aug. 7 would be regarded as controlling in the case of the Interborough lines. It was definitely agreed to by both that the principle of freedom to organize, the principle of freedom from intimidation or coercion, and the principle of arbitration should govern. Although this agreement was not reduced to writing and signed by the parties, it was approved by President T. P. Shonts and was relied upon by both sides in their subsequent negotiations.

"Prior to and during the hearings before us, the officers of the Interborough Rapid Transit Company sought to persuade their men not to join the Amalgamated Association. After the agreement of Aug. 7 they advised their men to form an organization of their own, as suggested by the president and vice-president of the company. The company stated that these suggestions were favorably acted upon, that nearly 10,000 out of about 11,000 voted to carry out this policy and that they selected committees to speak for them and elected offi-

## INTERBOROUGH RAPID TRANSIT COMPANY

165 Broadway

New York, September 12, 1916.

### TO ALL EMPLOYEES:

We thank our loyal men for their faithful and efficient services under trying conditions.

The Subway and Elevated lines have, by your good work, carried their usual number of regular passengers and in addition many who ordinarily use the street cars.

We urge you to continue your efforts to serve the public.

We have taken precautions for your safety.

If you are insulted or threatened, point out the wrongdoers to the police and report the facts promptly so that the evidence may be presented to the courts.

A large number of such offenders are now in the penitentiary.

You have a right to go about your business in peace and we believe that the Judges and police will put a stop to law-breaking in this city.

Keep up the good work and in a short time peace will be restored.

**We are proud of you.**

FRANK HEDLEY,  
Vice-President and General Manager.

Approved:

THEODORE P. SHONTS,  
President.



cers. The company contends that, as a result of the conference between the committees thus selected and their officers, working standards of wages and other matters were agreed upon; that this arrangement was submitted individually to the men, and that approximately 10,000 of them signed separately an identical memorandum or agreement embodying these terms. The company officials claim that this was done freely and fairly without violation of any of the principles of the agreement of Aug. 7 and that the men were permitted to and did exercise their constitutional rights. On the other hand, it is claimed by the officials of the Amalgamated Association that such a form of contract was in violation of the agreements of Aug. 7 and 30, and that these contracts thus signed by the men were secured through fraud, misrepresentation, coercion and intimidation.

"It appears that on Aug. 30 the officials of the Amalgamated Association first heard of the distribution of these contracts when the working standards were submitted to them as a basis for discussion. As soon as they had their counsel's opinion of the effect of this agreement upon membership in the union, they suggested that in addition to the four clauses there should be added the following:

"Nothing in this agreement is to be held to preclude any employee from joining any organization or any union, and will not preclude him from participating in any movement towards the betterment of his working conditions or the increase of his wages, and in the event that he sees fit to join such an organization with such objects in mind, it will not be considered a breach of this agreement."

"It appears from the minutes of the conference and the direct testimony before us that if such a course had been accepted, difficulty might not have arisen at this time. It is regrettable that at this point the parties apparently became distrustful of each other. From the testimony it appears that the men believed that an attempt was being made to deprive them of the rights which had been guaranteed to them by the agreement of Aug. 7. On the other hand, the company officials apparently believed that the officials of the union were seeking to prevent the men from exercising their right to prefer the Brotherhood of Interborough Employees to the Amalgamated Association.

"The union leaders concede that at this time no effort was made to utilize the processes or machinery of arbitration provided in the agreement of Aug. 30. On Sept. 1 a communication was sent to the chairman of the Public Service Commission by counsel for the men enclosing a copy of a letter to the Mayor, but attention is directed to the fact that in this communication it is expressly stated that no complaint is made 'at this time' to the commission, to the Mayor or to the chairman of the commission. Nor does there appear in the resolutions adopted by the men anything indicative on their part of readiness to follow the methods provided for in the agreement for arbitration. Yet the claim is made before us by the spokesmen for the union that on Aug. 30 there was an obligation on the part of the Interborough to arbitrate all differences that might arise, even though they involved questions of personal honor.

"It is our opinion, after listening to both sides and carefully reviewing the testimony, that whatever may be the condition of the mind of the officers of the union or the officers of the company, there is a clear duty to the public which the underwriters of the agreement of Aug. 7 and this commission have the right to assert. This controversy does not involve the issue of trade unionism in this city. To-day, as on Aug. 7, the clear, legal and moral principles governing the situation remain the same. Each side believes that it is standing for its rights, but the rights of both sides are subordinated to the rights of the public, and it remains as true to-day as Aug. 7 that the public's right to have

controversy upon its railroads settled peaceably and without resort to a war of any kind is a right superior to the rights of either the men or the company.

"We believe that the agreement has not been destroyed by the acts of the parties. Though it has been violated, the moral obligation to maintain it still continues. It was deliberately made, and guaranteed by the Mayor and the chairman of this commission. The public was also a party to this agreement. Whatever the other two parties may do, they cannot deprive the public—the third party—of its rights under the agreement. It was the clear intention of all parties concerned, including the Mayor and the chairman of the commission, that neither side should resort to the strike or lockout until there had been recourse to arbitration. There should be in existence effective legislation to meet such situations as these, but in the absence of such legislation there is no reason why the moral pressure of the whole community should not be exerted to compel both parties to observe the agreement which they state was in its essence fair and reasonable and which they regarded as 'sacred.' "

Commissioners Hayward and Hodge dissented from the first part of the finding, providing that the question whether the distribution of the individual contracts constituted a violation of the settlement plan should be arbitrated. These two commissioners were of the opinion, it was reported, that the individual contracts were sent out by the Interborough Rapid Transit Company before Mr. Hedley on Aug. 30 orally pledged the company to follow any of the provisions of the New York Railways settlement of Aug. 7, and therefore the Interborough line could not be asked to arbitrate something done during the interval while they were not under any obligations whatever.

#### INTERBOROUGH AND NEW YORK RAILWAYS REFUSE TO ARBITRATE

After learning of the proposals made by the Mayor and the commission, the New York Railways and the Interborough Rapid Transit Company on the same evening each issued a notice to employees refusing to consider any of the propositions put forward. In regard to the charges of fraud, etc., in the obtaining of the individual working agreements, it was averred that the best evidence of their falsity was the fact that so many employees were carrying out the contracts and rendering service in spite of the strike calls. As for arbitration and the continuation of conferences with the union, it was emphasized that no further dealings would be had with representatives or members of the Amalgamated Association.

On Wednesday morning, Sept. 13, the commission resumed its hearings in order that it might receive the formal replies of the companies and the union to its plan of settlement. In reiterating the stand taken on the previous evening, President Shonts through counsel submitted a statement in part as follows:

"The Interborough Rapid Transit Company cannot arbitrate its right to enter into agreements with 10,306 of its employees out of a total of 11,800, when the employees who have signed are content with those agreements and are endeavoring to carry them out in good faith. It cannot arbitrate its own good faith in becoming a party to those agreements, when they are definite as to pay and terms, signed by the employees upon the recommendation of their own duly appointed agents, and to-day are fully accepted by the great mass of our loyal employees.

"The New York Railways cannot arbitrate the causeless desertion of its service by its striking employees when their differences with the company were in process of orderly adjustment under the terms of the agreement



of Aug. 7 underwritten by the Mayor and the chairman of the commission.

"The officers, agents and members of the Amalgamated Association have constantly made either veiled or open threats of a strike while we were endeavoring by conference to adjust all matters of difference with our employees. It is apparent that they cannot be depended upon to keep their agreements for the peaceable and orderly adjustment of differences.

"Any further conferences with such men would get us nowhere, and in the meantime our discipline would be demoralized, to the great injury of the public and ourselves. Both companies must respectfully decline to hold any further conferences with the officers, agents or members of this association, or of any persons affiliated with them."

#### UNION WOULD ARBITRATE INDIVIDUAL WORKING CONTRACTS AND MANNER OF OBTAINING THEM

The answer of the union to the proposals of Mayor Mitchel and the commission, in general one of acceptance covering all the railways then affected by the strikes, was stated by Mr. Fitzgerald in language in part as follows:

"While we are concerned mainly with the recommendations made by the Mayor and the commission, there is one statement made by the commission in its opinion, which we cannot permit to pass without comment, *i.e.*, that 'this controversy does not involve the issue of trade unionism in this city.' We most decidedly take exception to this statement and submit that it is unwarranted and unjustified by the evidence.

"Any position which I might take with reference to the recommendations of the Mayor and the commission, would be dependent upon the companies agreeing that all employees, including those who have been discharged by the company, be restored to their former positions and ratings without prejudice as of Aug. 29, and that both the companies and the employees be placed in the position as to all matters as of Aug. 30, this to include recognition by the company of their right to organize, their right to meet collectively and in conference with the company, and the right of arbitration of all matters in dispute which cannot be mutually agreed upon in conference.

"We will arbitrate the question of the fairness or unfairness of the individual contract of employment, called by the company 'working agreement.' We will also arbitrate the question of the fairness or unfairness of the methods employed by the company in obtaining signatures to them, and we will be only too pleased to take the suggestion of this commission that the conference heretofore held between the companies and the committee of the employees and their spokesmen should be continued with an impartial person who should have no authority to decide, but merely to preserve the parties from misunderstandings and disagreements, and that such conferences in the future should be held in public. These suggestions as to an impartial person presiding over the parties and the public character of the conferences are most excellent ones."

At this point Mr. Fitzgerald read from the memorandum of the commission that had a paragraph been added to the Interborough's individual working agreement with the men allowing them full union rights, the present strike situation might not have arisen, and then proceeded as follows:

"In view of this finding, of course, we expect that the members of our organization shall, notwithstanding these so-called 'working agreements,' have the right not only to enjoy all the benefits of our organization, but to

participate in all of its deliberations in any way they see fit."

#### COMMISSION INVESTIGATES THIRD AVENUE CASE

In the memorandum of Sept. 12 the Mayor and the commission carefully refrained from making any reference to the Third Avenue and Second Avenue strikes, evidently because of the feeling that one general plan of settlement would be sufficient for all lines. With the rejection of its proposals, however, the commission proceeded to take up in detail the case of the Third Avenue Railway, and the first hearing was held on Thursday afternoon, Sept. 14.

At this hearing, before Mayor Mitchel and the commission, Mr. Fitzgerald repeated his charges of collusion between the Third Avenue Railway and the New York Railways, but Alfred A. Cook, attorney for the former company, stated that there had been no conference or communication, direct or indirect, between any representatives of these companies either in regard to signing the settlement pact of Aug. 7 or with reference to any unanimity of action in carrying out such an agreement. President Whitridge stated emphatically that he had had no conferences with New York Railways or Interborough Rapid Transit Company officials and had not talked or communicated with any of them regarding strike matters. Mr. Cook testified that he had not drafted any individual working agreement for Third Avenue men, and that this point to his knowledge had never been contemplated or discussed. Edward A. Maher, Sr., vice-president and general manager of the company, also declared that such an agreement had never been suggested or considered.

In regard to the company's position concerning arbitration, Mr. Cook said that when Mr. Whitridge returned from Europe on Aug. 28 he accepted without discussion the settlement agreement made in his absence, and ordered that it be carried out in letter and in spirit. At the first conference with the men Mr. Whitridge asked for an abatement of their demands in order that a mutual agreement might be made without arbitration. He at no time refused arbitration, but simply endeavored to avoid the expense and delay of arbitration by asking the employees to lessen their demands, especially on the point of wages. As the conference continued, some of the demands were agreed upon, and others were left for arbitration. At the last conference, on Sept. 6, Mr. Maher told the men that without doubt a number of points would have to be arbitrated, and that the company would like to get at the matter promptly and was prepared to go ahead at any time. The men said that they would suggest an arbitrator in about forty-eight hours. Thereupon the company selected Mr. Garrison, but the next move of the men was the strike on Sept. 9.

At the hearing the commission entered on its record the report of a conference on Sept. 9 at the Bar Association between Mayor Mitchel, Chairman Straus, union leaders and head of the Third Avenue locals. It was shown that at this meeting, which was before the strike order, the Mayor urged the men to keep the peace agreement of Aug. 7, for in his opinion to go on strike in the face of Mr. Whitridge's proposal to arbitrate would be a deplorable breach of the agreement. Mayor Mitchel stated that not even a declaration of intent or purpose on the part of the company would justify the men in breaching the contract, for if they had any grievances the only proper recourse was to arbitration under the contract itself. Chairman Straus took the same point of view, but the men refused to abide by it and struck.

#### HOW THE SERVICE WAS KEPT UP

The main fact clearly discernible from electric railway operation in New York City from Sunday, Sept. 10,



up to the time when this issue went to press was that the first strike, that on the subway and elevated lines of the Interborough Rapid Transit Company, had proved a flat failure and that the subsequent strikes on the various surface lines in Manhattan and the Bronx were gradually wearing themselves out.

On Sunday, the elevated and subway lines of the Interborough Rapid Transit Company were hit with an avalanche of passengers on account of the suspension of service on the Third Avenue and Second Avenue lines but more than normal service was offered, and the same standard was maintained during the week. On Wednesday, the elevated and subway service was 20 per cent more than normal in the rush hours. On Monday the total number of passengers on the elevated and subway



NEW YORK STRIKES—SAMPLE OF WIRE SCREENS USED TO PROTECT MOTORMEN

lines was 2,281,442, as compared with a total of 1,898,660 for the same day of last year. On Tuesday the total was 2,091,341, as compared with 1,653,653 last year; on Wednesday the total was 2,091,171, as compared with 1,635,540 last year, and on Thursday the total was 2,078,755 as compared to 1,629,166 last year. On Thursday the company reported that 10,306 out of its 11,800 employees had signed the individual working agreements. A notice issued during the week, thanking the employees for their loyal and efficient service under trying conditions, is reproduced on page 486.

Service on the New York Railways during the week, while not starting so well as expected, became gradually better. The proclamation of amnesty to striking employees if they would return before 1 p. m. on Saturday, Sept. 9, resulted in about 100 employees going back to work, and this number continually increased during the week. The company early determined not to employ strike-breakers on the surface lines, in order to avoid violence, which naturally handicapped it in offering service to the public. In spite of this fact, however, the maximum number of cars in operation gradually rose from 250 on Sunday to 327 on Thursday, the normal being about 1290. The individual contracts increased in this time from 958 to 1015. On Wednesday, the company dismissed one-third of the 3000 strike-breakers that had been secured by itself and the Interborough Rapid Transit Company, for it was found that enough experienced men could be hired to restore the service gradually to full operation with the aid of old

employees. On Wednesday, ninety-five experienced men were chosen from 600 applicants.

The various sections of the Third Avenue Railway system showed different degrees of success in operating cars during the week. The lines of the Yonkers Railroad and the Westchester Electric Railroad in Westchester County did not offer any service at all to the public on account of the restrictive experience ordinances in Yonkers, Mount Vernon and New Rochelle. The Union Railway, the subsidiary operating in the Bronx, started out with thirty-two cars on Sunday and gradually increased the number to 141 on Thursday, 252 being the week day normal. The Third Avenue Railway proper, operating in Manhattan, had forty cars in operation on Sunday and increased this number to 248 on Thursday, the weekday normal being 505. On Sunday the company offered double pay to employees who remained loyal and about sixty returned at that time. More came back later, but the strikebreakers to some extent were used on the red car lines.

No strikebreakers were used on the cars of the Second Avenue Railroad. Instead of the normal 105 cars on week days the company operated from twenty to twenty-six. It was stated that most of the Second Avenue men were not on strike but were intimidated from operating the cars.

During the week the service on the surface lines was suspended at night in order to avoid violence. Extra service in suburban districts was given by the New York Central Railroad and the New York, New Haven & Hartford Railroad, and all sorts of automobile conveyances were used in the city, especially for cross-town travel. On the whole there was not much disorder in connection with the strike, owing to the precautionary measures taken by the company and the police. Wire screens, such as shown in the accompanying illustration, were used on rapid transit and surface cars, and passengers were prohibited from riding on the elevated platforms in order to keep strikers away from brakes and emergency cords. There were many instances of bricks thrown at surface cars and elevated trains and occasional attacks on those who remained on duty, but there was no rioting.

## Illinois Commission Report

The second annual report of the Illinois Public Utilities Commission, advance sheets of which are just off the press, indicates the divers activities of the State regulatory body. The report discloses that the commission has entered orders in 1644 formal cases, of which thirty-nine, or 2.4 per cent, have been appealed to courts possessing jurisdiction. Of these appealed cases thirteen were carried to the Supreme Court of Illinois, which reversed the commission in only two of its orders, and reversed the Railroad and Warehouse Commission, the predecessor of the present commission, in two other orders. Thus the commission itself has been finally reversed in only one-tenth of 1 per cent of its orders. The commission, since its inception in January, 1914, to the date of the second annual report, has disposed of 770 informal cases requiring more or less extended investigation, and has received fees (principally for authorization of securities) amounting to \$816,223 against disbursements for salaries and other expenditures amounting to \$309,883—a net balance turned into the State's treasury of more than \$500,000. A complete tabulated list of the stocks, bonds and other securities authorized by the commission shows that all stock is required by the commission to be sold at par, and, with two exceptions, all bonds were required to be sold at 85 or above.





PORTLAND RAILWAY COMPANY'S FLOWER GARDEN JUST GETTING STARTED



THE OFFICIAL PORTLAND ROSE—ONE OF MANY IN THE RAILWAY COMPANY'S GARDEN

## Shop Grounds Beautified by Roses

Portland (Ore.) Railway Plants a Flower Garden in Which Its Men Take a Keen Interest

BY F. P. MAIZE

Master Mechanic Portland Railway, Light & Power Company

THE north building of the group comprising the repair shops of the Portland Railway, Light & Power Company has a frontage of about 240 ft. and stands back 80 ft. from the street. Until two years ago this approach was a rough gravel patch, a thrifty bunch of weeds here and there being the only ornamentation. A glance at the illustrations will show what a change has been made since the idea was conceived that this space might be turned into a flower garden.

A cement walk leads from the building to the street, and on each side of this walk a square about 80 ft. on a side was formed. The top layer of stones, weeds and gravel was removed and a layer of good soil taken from the company's land was laid in its place. This earth was well mixed with fertilizer obtained from cattle cars in the nearby freight yard. The squares were covered with fine sod and inclosed with a hedge of rose bushes. A few flower beds were made within these squares, and it was not long before the garden began to make a really creditable appearance.

From the very first the men showed their interest by bringing seeds, slips, bushes and bulbs, until at the present time there are tulips, daffodils, gladioli, phlox, cosmos, dahlias and more than a hundred rose bushes in this garden. Among the roses are the beautiful pink Caroline Testout, the official rose of Portland, and the magnificent, snow-white, Frau Karl Druschki, gorgeous J. B. Clarks and Ulrich Bruners, and many other choice varieties. We now have a constant succession of flowers for ten months of the year, all blooming with the profusion of growth peculiar to Portland vegetation. Many of the rose bushes have as many as fifty roses and buds in bloom at one time.

All of this work has been done without expense to the company, as the flowers have been donated and the garden is cared for by the shop men. The effect of this improvement is not restricted to the exterior, as there has been a noticeable change in the appearance of the interior of the buildings, the men seeming to take a greater pride in keeping the shops in a neat and orderly condition. Many of them show their interest in the garden by bringing their families to see the flowers on Sunday, or in the evening, and one of them expressed the general sentiment when he said: "It's a lot nicer to look at that beautiful garden than at an old gravel patch."



FLOWER GARDEN IN FULL BLOOM IN FRONT OF SHOPS OF PORTLAND RAILWAY, LIGHT & POWER COMPANY



# Holding Company Traveling Experts

The Organization and Work of the Traveling Railway Specialists Recently Appointed by Henry L. Doherty & Company Are Described in This Article

ONE of the important advantages possessed by a holding company of the operating type is that, owing to the large volume of work handled, it can afford to employ more experienced and efficient operating men and engineers than could any of its constituent companies. Further, in a large organization there are usually a number of men who have worked and studied along certain lines until they are authorities of note in their respective fields. One of the problems confronting such a company is that of utilizing the talents of its specialists to best advantage. It has been thought, therefore, that a description of the plan recently adopted by Henry L. Doherty & Company, 60 Wall Street, New York, might be of general interest.

### INAUGURATION OF THE PLAN

In the belief that a better utilization of the talents of the trained specialists in the organization would result in lower operating costs and increased safety, it was proposed at the meeting of the officials of the traction group of the Doherty interests, held in Chicago last May immediately before the annual convention of the National Electric Light Association, that some of the operating officials of the company who had special-

a traveling specialist bestows particular recognition on a man who, by careful study and hard work, has become a recognized authority in some field of endeavor. The fact that such recognition of merit is granted to deserving men furnishes an incentive for the younger men who aspire to the higher positions in the company to study and specialize on some particular line in connection with their regular work.

Briefly stated, the duties of these specialists are: To visit and inspect, with particular reference to their respective specialties, the several railway properties forming the Doherty traction group; to promote the use of standard methods, practices and equipments, and to advise the officials of local companies on special problems. They act chiefly in an advisory capacity; that is, they do their work as any outside consulting engineer would do it, making a report of their findings and a recommendation both to the local manager and to R. F. Carbutt of the New York office of the Doherty interests, who, as railway engineer for the company, has the general supervision of their work as traveling specialists. They are expected to write up their report on a property which has been inspected before they leave the property, so that all details will be fresh in

(Name of Company)								
Total Car Miles		Cost of Railway Car Material			1916			
Material	Total Cost	Cost per 1000 Car Miles	Miles per Unit	Manufacturer of Material	Type & Kind of Material	Unit Cost including Freight	Date of Purchase of Material	Size of Material
Armature Coils								
Babbitt (Armature)								
.. (Bearings)								
Brake Shoes								
.. Heads			Per Shoe					
.. Accessories								

BLANK FORM USED BY TRAVELING SPECIALISTS FOR COMPILING COST DATA

ized along certain lines be appointed traveling railway specialists. The managers of the several properties approved the plan and took steps to put it into action at once. So far two appointments have been made: Albert Swartz, vice-president Toledo & Western Railway, has been appointed traveling track specialist, and Arthur Brown, master mechanic, Toledo Railways & Light Company, traveling master mechanic. These appointments were noted in the news columns of the ELECTRIC RAILWAY JOURNAL of June 10, 1916.

### SELECTION OF SPECIALISTS

In the selection of these specialists it was felt that it would be a blunder to remove them permanently from their present positions and thus deprive their properties of their regular services. It seemed best, therefore, to continue them in their regular positions but to give them opportunities to get away occasionally. The plan of appointing regular operating men for such positions has several advantages to commend it. The men selected as specialists are fresh from the firing line, as it were, and the problems they are advising on are their own problems, solved or to be solved, whichever the case may be. Their viewpoint is that of the operating man, and as a result they do not tend to belittle the local problems which are bothering the officials of subsidiary companies. An appointment as

mind while the report is being written. The expense of inspection is charged against the local company just as it would be had the work been done by an outside party. Occasionally some special problem requiring time for its solution may be brought to their attention. In such cases, the work in connection with the problem is carried on by the local people, who keep the traveling specialist informed of its progress.

Visits to the several properties are not scheduled, the traveling specialist using his own judgment in the matter and selecting a time when he can best get away from his own property. Two or three days are ordinarily spent in the inspection of a single property. The specialist usually tries to inspect several properties in the course of one trip, and to economize time groups them geographically. A few days before starting out he telegraphs the managers of the properties he is planning to visit, notifying them of his schedule. The advance notice enables local officials to formulate the problems on which the advice of the specialist is desired.

### WHAT THE SPECIALISTS ARE DOING

In their inspections this year the specialists are paying particular attention to standardization matters. In the operation of isolated properties it is often the case that methods and practices, particularly those of a minor nature, differ considerably. Standardization



## LIST OF THE DOHERTY RAILWAY PROPERTIES

Name of Company.	Location.
Amarillo Street Railway.....	Amarillo, Tex.
Athens Railway & Electric Company.....	Athens, Ga.
Bartlesville Interurban Railway.....	Bartlesville, Okla.
City Light & Traction Company.....	Sedalia, Mo.
Cumberland & Westernport Electric Railway.....	Frostburg, Md.
Durham Traction Company.....	Durham, N. C.
Hattiesburg Traction Company.....	Hattiesburg, Miss.
Meridian Light & Railway.....	Meridian, Miss.
St. Joseph Railway, Light, Heat & Power Company.....	St. Joseph, Mo.
St. Joseph & Savannah Interurban Railway.....	St. Joseph, Mo.
Manhattan & Queens Traction Corp.....	Long Island City, N. Y.
Toledo Group.....	Toledo, Ohio
Adrian Street Railway	
Maumee Valley Railway & Light Company	
Toledo, Ottawa Beach & Northern Railway	
Toledo Railways & Light Company	
Toledo & Western Railway.	

cuts down overhead expenses, lessens the investment in stockroom material, facilitates inspection and repairs, and makes buying on a larger scale possible.

To facilitate their study of a given property, the specialists make use of a table of cost data showing costs of the various items for the current year and for the year preceding. A blank form of the kind used for listing the cost of car material used in maintenance work is shown in the illustration on page 491. The material is listed under the main headings of: Armature coils, babbitt (armature), babbitt (bearings), brake shoes, brake heads, brake accessories, brushes and brush holders, carwheels, commutators, field coils, fuses, gear grease, gear pinions, gear wheels, glass, incandescent lamps, lubricants, motor repairs, sand, soap for car cleaning, trolley springs, washers and harps, tape, trolley poles, trolley wheels, and waste.

A study of such a table of maintenance costs enables the specialist to pick out items for which either a considerable increase or decrease in maintenance cost has been made. Also from his knowledge of maintenance costs in general he can select the items that appear either excessively low or high. An increase in cost of maintenance of a particular item is investigated to see whether it is due to some method which is producing results no better than were formerly obtained.

A decrease is investigated to see that results as good as formerly obtained are being secured and to be sure that the results secured by the cheaper process in no way militate against safety in operation. If costs for both years are excessively high, the methods are examined to see how they can be changed so as to secure as good results at a lower cost. If costs seem to be lower than the specialist thinks they should be, an examination is made to see whether the low costs are due to an attempt to get too much wear out of a given piece of equipment, and thus affect the safety of operation and possibly the cost of maintenance of some other equipment item. For example, a very low maintenance in car wheels might mean that the flanges were being worn until they were very thin, thus increasing the danger of derailments and damage to track and special work. Excessive brakeshoe costs might be due to the use of a shoe not suitable to the local conditions. In such a case the specialist, from his wide knowledge of the subject, recommends a suitable type of shoe.

In the work already done the specialists have been able to advise changes in methods and practices which will result in annual savings to one local company of several thousands of dollars per year on a single item. On many items the standardization of methods and the advice of the skilled experts will result in only small savings. However, a number of small savings in each of the companies aggregates a large total when all the companies are considered. In some cases the specialists advise greater expenditures in maintenance because, in line with the broad policies of the Doherty Organization, safety of operation is placed above cost.

Mr. Swartz has already inspected the properties lo-

cated at Amarillo, Tex.; Sedalia, Mo.; Athens, Ga.; Durham, N. C.; St. Joseph, Mo.; Hattiesburg, Miss.; Meriden, Miss., and Bartlesville, Okla. He will inspect the Cumberland & Westernport and the Manhattan & Queens properties some time this summer. In this his first round of inspections he has been placing special stress on the subjects of rail bonding, tie spacing, track grinding and street paving.

Mr. Brown has not had much time to give to the work as yet, but he is planning to inspect the Cumberland & Westernport and Manhattan & Queens properties at an early date. The work he has done so far indicates that the greatest savings will be on the items of brake shoes and car accessories. It is anticipated also that there will be a material increase in safety of operation as a result of his inspections.

The managers of local properties are, of course, not bound to follow the advice of the traveling experts, but as it is up to them to make good on their respective properties, they have been very glad to receive any information which enables them to render better service at the same cost or the same service at a lower cost. The results of the work of these specialists so far has been so satisfactory that the appointment of a traveling traffic study specialist is being urged. His appointment would not mean that extensive traffic studies would be made on the different properties, but studies of the relation of the traffic to the car schedules would be instituted in an endeavor to cut down the empty-seat mileage without reducing the quality of the service.

## Railway Signal Association Meets

The annual convention of the Railway Signal Association was held at the Grand Hotel, Mackinac Island, Mich., Sept. 12-14, 1916. During the convention there were presented a number of reports of committees, among which was a special committee on harmonizing specifications and standing committees on signaling practice, standard designs, wires and cables, storage battery and charging equipment, direct current relays and power interlocking. An amendment to the constitution was also submitted and passed, thus raising the dues for the active and associate members of the association to \$4 per annum. Progress reports were presented also by the committees on maintenance and operation and on electrical testing.

The committee on electric railway and alternating current signaling presented specifications for alternating-current relays and for single-phase line transformers of the oil-immersed, self-cooled, outdoor-type designed for 4400 volts or less. This committee also submitted descriptive matter on alternating-current signaling, including a technical account of the resonant shunt used for shunting out from signal apparatus heavy currents of frequencies other than that for which the system is designed. A number of brief outlines were presented to place on record data covering signal installations made upon steam and electric railways that use alternating-current signals. All of the installations thus referred to, with the exception of a few of one or two blocks' length each, have been described in past issues of the ELECTRIC RAILWAY JOURNAL. Reports were also received from standing committees on direct-current automatic block signaling and mechanical interlocking.

At the annual election of officers, Charles A. Dunham, Great Northern Railway, was made president; R. E. Trout, St. Louis & San Francisco Railroad, was elected second vice-president; W. H. Elliott, New York Central Railroad, having been made first vice-president without action. C. C. Rosenger was re-elected secretary-treasurer of the association for the coming year.



## Electric Service Over the Rockies

A unique method of calling the attention of the traveling public to the electric service over the Rocky Mountains by the Chicago, Milwaukee & St. Paul Rail-



ELECTRICALLY OPERATED OVER THE ROCKIES  
CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

way is shown by the accompanying illustration. This is taken from the letterhead of the stationery on the observation car of the "Olympian," which is one of the transcontinental trains operating between Chicago, Ill., and Seattle, Wash., over this route.

## Annual Report of National Safety Council

The third annual report of the secretary of the National Safety Council states that 1102 new members have been gained during the past year, an increase of 91 per cent, the present membership being 2020, with more than 10,000 representatives and 3,500,000 employees. The income from dues for the year was \$46,000 and the present surplus is \$4,600. At the present rate the income for the calendar year 1916 will approximate \$70,000.

More than 3,000,000 copies of over 270 different pieces of printed matter have been sent out. Last year the annual congress was attended by more than 1700 representatives, fifteen sections were organized and an instructive exhibit was conducted. The council spent more than \$5,000 on the congress. The information bureau is now well organized and there are two librarians in charge. Among the features of the work have been special and traveling exhibits, safety meetings in the plants of members, a new series of "Safe Practices Information Leaflets," co-operation in establishing a national fire and accident prevention day, etc. A field secretary has been engaged who started work on Sept. 1, and the staff now includes an editor.

The nominating committee has also presented its report. Among the nominations to directorships is that of Edward C. Spring, manager Lehigh Valley Transit Company, Allentown, Pa.

## Difficulties of New York Commission in Subway Construction Work

During construction of the new rapid transit railroads in New York City under the dual system contracts, the Public Service Commission for the First District has had to engage in many varied forms of activities. New streets have been laid out, bridges have been built, railroad tracks have been moved, tunnels built, new foundations have been placed under some of the tallest of Manhattan's skyscrapers, buildings have been cut in half, one five-story apartment house has been moved a considerable distance and placed on a new foundation, and in one instance a fire-engine house was floated bodily down the Harlem River and set in a new location. The commission's engineers are now to engage in a new venture, being no less than the changing of the course of a running stream—Downing Brook—which runs through a portion of Bronx Park. At one point the stream crosses the park line three times, and at each of these crossings runs through property which is soon to be used

for a yard for the storage of subway cars of the Interborough Rapid Transit Company. The course of the stream is to be diverted entirely within the park area, at present as an open running stream, but eventually it is to be diverted into a new trunk sewer which is now under construction.

## Electric Locomotives on the "Booster Special"

Special Train from Charles City to Cedar Rapids  
Hauled Over Four Lines by Five Locomotives

IN connection with a gas tractor demonstration held last month in Cedar Rapids, Iowa, a tractor manufacturer of Charles City arranged to run a special train of four coaches and a baggage car from the latter city to the show grounds in the former for the purpose of transporting a large company of boosters. To enhance the advertising value of this trip, the train was routed over the local electric lines as far



TRACTOR SPECIAL HAULED BY LOCOMOTIVES OF CEDAR VALLEY LINES

as possible, using the steam lines for the remainder of the trip. The total length of the trip was 125 miles.

The train left the station of the Charles City Western Railway in Charles City, Iowa, at 6 a. m., a buffet lunch being served in the baggage car. From Charles City to Marble Rock it was hauled over the Charles City Western Railway, a recently electrified 1200-volt direct-current line for which power is purchased from the Cedar Valley Light & Power Company. An electric locomotive used by the railway for



TRACTOR SPECIAL AT MARBLE ROCK, WITH LOCOMOTIVE OF CHARLES CITY WESTERN RAILWAY

freight service hauled the train. At Marble Rock the train was picked up by a steam locomotive and taken over the Rock Island Railroad to Cedar Rapids, where it was coupled to a steam locomotive on the Chicago, Milwaukee & St. Paul Railway. The last named shifted the train to the lines of the Waterloo, Cedar Falls & Northern Railway, the "Cedar Valley Lines," where two 600-volt electric locomotives were coupled to it and hauled it to the show grounds, which it entered to the music of a forty-piece band brought from Charles City.



# Medical Examinations of Employees\*

The Author Explains the Many Advantages of Such Examinations When Employees Are Engaged and Outlines the Essential Requirements

By DR. CHARLES H. LEMON

Chief Surgeon, Milwaukee Electric Railway & Light Company

MODERN business differs from that of a quarter of a century ago in many particulars. Under the old order, the man was not considered as an entity. He came and went as the needs of the business demanded. His relation to his employer was a negative one. His joy and his sorrow were shared by no one, and the tenure of his position was dependent largely upon the whim of his immediate boss. The corporation was without a soul, and in the keen competition which necessarily occurred the man was lost sight of.

In the development of modern business, with its very humane interest in the welfare of its employees, we find the railroads many years in advance of the other industries. Until within a few years no voluntary medical services were offered injured employees in our great American industrial establishments. How different from the very beginning of their corporative lives has been the practice of the railroads in taking care of their wounded employees. They have recognized for more than a half century that injuries incident to operation were properly chargeable to the cost of operation.

Railroad surgeons have been identified in the public mind with the operation of railroads ever since railroading began. The general supervision of the health of the employees, which follows as a corollary the general employment of physicians throughout a large railway system, is a fact of importance that should not be lost sight of. The friendly suggestion by the doctor to the man who is in failing health is the human touch of the corporation.

## ADVANTAGES OF EXAMINATION SET FORTH

In a diversified business such as ours the man seeking employment will represent every possible variety of human activity, from the illiterate foreigner who applies as a laborer to the highly trained engineer or accountant. For the particular department or bureau that is applied to there must be certain characteristics of mind and body that are required in the average man, and these necessary qualifications we have summarized in a group, and we call them "specifications." The applicant himself has by a process of self-elimination placed himself in a particular group when he applies to a specific department for employment. It is true he may be mistaken in his estimate of his ability, but we must at least recognize that he has specialized in his own case. This type of man, to my mind, is highly desirable, because in all but the lowest types of labor, where the bare necessities of life force the man into activity, we have the elementary idea of fitness expressed.

The purpose of specifications is not to bring a stumbling block to well intentioned applicants for employment. It is rather to standardize the type of man who shall form a group in order that the group may become efficient. The nearer the individuals of the group approach the specifications, the greater will be the effect of their team work.

In an exhaustive study of the changing personnel among trainmen, R. B. Stearns, vice-president Milwau-

kee Electric Railway & Light Company, prepared a comprehensive report, July 18, 1914, under the caption, "Recession Rate Among Trainmen and Estimated Average Annual Cost Properly Chargeable Against the Changing Personnel." This analysis of conditions among trainmen shows that the greatest loss from resignation occurs in the first two years of the service, and that after the third year the trainman has reached a condition of stability and the percentage of loss from resignation or discharge is exceedingly small. In this report Mr. Stearns gives a table to show average annual cost properly chargeable to the 433 trainmen in the service one year or less at that time (1913). The table follows:

	Year 1913	Cost per Trainman in Service
(a) Practice money, at \$10 each.....	\$6,340	\$14.64
(b) Wages paid conductor instructors.....	1,408	3.25
(c) Wages paid regular instructors (75 per cent).....	3,330	7.69
(d) Rent of instructors' room (75 per cent).....	270	0.63
(e) Cost of accidents and investigation.....	146,475	338.28
(f) Cost of damage to cars.....	2,573	5.94
	<b>\$160,396</b>	<b>\$370.43</b>

It may be concluded from the above that more care in the selection of employees to determine their relative fitness for the position, temperamentally as well as physically, may operate to effect a better class of employees and thus reduce the recession rate. This suggests the consideration of an employment bureau, wherein a careful study of the qualifications of each applicant may be made and a follow-up system inaugurated to inquire into the applicant's previous record and experience, and associate his fitness for the position with his physical, mental and temperamental qualifications. Such a bureau if properly organized might well act for all departments, and thus not only relieve the superintendent of transportation of the selection of several hundred employees annually, but relieve other departmental heads of similar burdens as well.

It will be seen, for instance, in the case of trainmen who have been in the service less than one year, that it is probably far less expensive to retain the services of an employee in the case of minor offenses of discipline during his early period of service than to discharge or allow him to resign, providing other necessary qualifications and fitness for the position have been demonstrated to be reasonably satisfactory.

It cannot, therefore, be successfully contended that the interest of the company is other than to find the man for the job and then train him for high efficiency and retain him in the service. We may infer from the relatively high recession rate which is probably characteristic of most other transportation companies, that the man who seeks the employment in nearly one-half of the cases does not do so from a firm conviction that he is fitted for the service, but rather to serve some temporary need or to fill in a gap while waiting for something to turn up. An employment bureau that could eliminate a fair percentage of these floaters would serve a most desirable purpose. The physical test will

\*Abstract of paper read at Milwaukee Company Section, Oct. 28, 1915.



eliminate a considerable percentage of applicants, and if any plan can be devised which will make their employment more attractive, such as has been the case in the last few years in this company, the recession rate hoped for by Mr. Stearns should become possible.

In the foregoing discussion we have seen that the employer will have to look about him to find the man suitable for the work in hand. We must assume that the head of a department has the best interest of his company at heart and will not employ a man who is manifestly incompetent, or who, by reason of manifest physical defects, could cause undue hazard. When labor is scarce and the management, because of the necessities of the business, holds the head of the department to an average, rather than to a high rate of pay, the temptation will become great to employ men who are physically below the average.

#### CHARACTER OF EXAMINATIONS

The work of the surgeon in these examinations must be absolutely impartial. It must not be so rigid in its interpretation that none but the most perfectly endowed will be able to pass. Above all, he should keep himself clear of fads, which are the bane of the medical profession, and his decision, after a careful investigation of the applicant, should be based upon actual findings rather than upon preconceived opinions. Sound lungs; a sound heart that will not flag under severe strain; a frame well knitted together; vision, at least normal in extent; hands and feet without deformity; an erect carriage; eyes which look you straight in the face; a step that is elastic, and a body free of any general blood taint; these are some of the qualifications that we must hope to attain in the average employee.

Many men who come to the examination, and to the office of a physician for the first time are visibly nervous. For such a few minutes of general conversation, which will give the applicant an opportunity to get his bearings, will frequently quiet down a heart whose beatings can almost be heard through the chest wall. That there will be a definite number of rejections, especially for the train service, goes without saying.

It is the duty of the medical examiner to stand firmly upon the result of his examination. To be influenced by the head of a department, who pleads for leniency because of the dearth of available material, is a confession of weakness. I do not think the opinion of the company's surgeon should be a last word for the departmental heads. There are times and circumstances which should justify the employment temporarily of men rejected by the medical department. The burden of the responsibility, however, should rest upon the departmental head exercising this right, and he should exercise this right only under conditions which he would feel justified in assuming that the management of the company would sanction.

It might be of interest to here briefly recite the physical requirements and characteristics necessary to employment:

1. *Age*.—Acceptable applicants for employment shall be eighteen to forty-five years old, except temporary employees, who may be employed up to fifty-five years of age. Messengers, office boys and minor clerks under the age of eighteen years may be employed by direction of a departmental head. No one shall be employed under sixteen years of age, excepting with the approval of the proper civil authorities.

2. *Height and Weight*.—Height shall be suited for the particular class of work. The weight shall correspond in general with the normal weight for the age and height, as shown by the standard table, but a variation of a maximum of 20 per cent over or 20 per

cent under weight, as indicated on the table, may be permitted when other conditions are favorable. Special requirements shall be given due consideration.

#### *Essential Physical Requirements*

The following qualities will be required in all employees except in special cases where specific exceptions are provided:

3. Two good eyes.
4. Ten fingers free from deformity.
5. Arms that move freely at wrist, elbow and shoulder.
6. Legs of equal length, freely movable at the hip, knee and ankle.
7. Feet without broken arches, known as "flat-feet."
8. An elastic or springy gait.
9. Well developed chest.
10. Sound teeth.
11. Good hearing.
12. General appearance of good health.

#### *Medical Requirements*

13. No person who is a "consumptive" or who has lived in the same house with a "consumptive" within one year, shall be employed.

14. No person having venereal disease shall be employed.

15. No person with a history of "fits" or "convulsions" shall be employed.

16. No person with a habitual headache shall be employed.

17. Persons wearing glasses should not be employed except for clerical or technical positions.

18. Where a person is known to be color blind he should not be employed, as a color-blind person would not recognize a red "danger" signal.

19. No person having a hernia, varicose veins or "open sores" shall be employed.

20. No person with a spinal or other gross deformity shall be employed.

21. No person with an active skin disease shall be employed.

22. No person giving a history of mental or nervous disease shall be employed.

23. Every applicant before being employed must pass a satisfactory medical examination.

24. Manifest defectives should not be sent to the medical department for examination.

25. Employment cards should state the exact character of employment of individuals in order that the medical department may be advised as to the special medical tests required for various occupations, such as trainmen, linemen, teamsters, clerks, etc.

In addition to the foregoing essential qualifications necessary to employment, due consideration and weight are also given to personal appearance, social conditions and education and training.

No records are kept in the medical department of men applying for temporary employment, because of the enormous amount of clerical work involved. Excluding common laborers, these temporary employees represent largely a floating class, and many physical defects are found among them. Departmental heads not infrequently make permanent these temporary employees, and when they submit themselves for examination before admittance into the Employees' Mutual Benefit Association, a record is then obtained.

As applying to applicants for employment in the transportation service, it might be stated that approximately 40 per cent of those undergoing physical examination are rejected, principally on account of defective vision or for hernia.



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

## ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

Programs for Accountants', Engineering, Claims and Transportation & Traffic Associations Are Given  
—Also Notes on Meetings of Valuation and Entertainment Committees, and  
Revised Chicago Special Train Schedule

### Programs for the Convention

Secretary E. B. Burritt has just announced the following tentative programs for the Atlantic City convention. The American Association program appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for Aug. 12, 1916, page 280.

#### PROGRAM OF ACCOUNTANTS' ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 5 p. m.

Meeting held in Accountants' Hall

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees.

- (a) Resolutions,
- (b) Nominations.

Reports of committees:

- (a) Accounting definitions,
- (b) Standard classification of accounts,
- (c) Representing Association at Convention of Railroad Commissioners.

Paper on "The Statistician," by W. E. Jones, statistician, The Connecticut Company, New Haven, Conn.

Paper on "Commission Valuation of Public Service Properties for Purposes of Rate Regulation," by John E. Benton.

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Joint session with Engineering Association  
Meeting held in Engineers' Hall

Reports of committees:

- (a) Engineering-Accounting,
- (b) Life of Railway Physical Property.

3.30 p. m. to 5 p. m.

After joint session, meeting held in Accountants' Hall  
Address on "Commission Accounting Inconsistencies," by Homer A. Dunn, C.P.A., Haskins and Sells, Certified Public Accountants.

Paper on "The Federal Census of Electrical Industries," by William H. Steuart, chief statistician for manufactures, Department of Commerce, Bureau of Census, Washington, D. C.

Wednesday, Oct. 11

2 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association  
Meeting held in Greek Temple

Reports of committees:

- (a) Cost of rush-hour service,
- (b) Fares and transfers.

Prepayment Systems—General Discussion.

Reports of committees:

- (a) Express and freight traffic.

Address on "Some National Issues in Local Street Railway Franchises," by Clyde L. King, professor in the University of Pennsylvania, Philadelphia, Pa.

Reports of committees:

- (a) Passenger, express and freight accounting.

Thursday, Oct. 12

2 p. m. to 2.30 p. m.

Joint session with Claims Association  
Meeting held in Accountants' Hall

Reports of committees:

- (a) Claims-Accounting.

2.30 p. m. to 5 p. m.

After joint session

Address on "The Part which Accounting has Played in the Development of Modern Industry," by John R. Wildman, professor in New York University, New York, N. Y.

Reports of convention committees:

- (a) Resolutions,
- (b) Nominations.

Election of officers.

Installation of officers.

Adjournment.

#### PROGRAM OF ENGINEERING ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Convention called to order.

Annual address of the president.

Annual report of executive committee.

Annual report of secretary-treasurer.

Appointment of convention committee:

- (a) Resolutions.

Reports of committees:

- (a) Power distribution,
- (b) Standards (on recommendations contained in report),
- (c) Special subcommittee on stranding table,
- (d) Committee on standards,

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Joint session with Accountants' Association  
Meeting held in Engineers' Hall

Reports of committees:

- (a) Engineering-Accounting,
- (b) Life of railway physical property.

3.30 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association  
Meeting held in Greek Temple

Reports of committees:

- (a) Block signals for electric railways,
- (b) Standards (on recommendations contained in above report),
- (c) Transportation-Engineering.



Wednesday, Oct. 11

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:

- (a) Power generation,
- (b) Standards (on recommendations contained in above report),
- (c) Way matters,
- (d) Standards (on recommendations contained in above report),
- (e) Report of delegates to Good Roads Congress.

Thursday, Oct. 12

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:

- (a) Equipment,
- (b) Standards (on recommendations contained in above report).

Paper on "Lighting of Cars."

Reports of committees (continued):

- (c) Buildings and structures.

Friday, Oct. 13

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:

- (a) Heavy electric traction,
- (b) Standards (on recommendations contained in above report),
- (c) Electrolysis.

General business.

Report of committee on resolutions.

Report of committee on nominations.

Election of officers.

Installation of officers.

Adjournment.

#### PROGRAM OF TRANSPORTATION & TRAFFIC ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 4.30 p. m.

Meeting held in Greek Temple

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:

- (a) Resolutions,
- (b) Nominations.

Reports of committees:

- (a) Standards,
- (b) Construction of schedules and time-tables.

Paper on "Development of Schedule Makers," by H. C. Donecker, assistant general manager, Public Service Railway, Newark, N. J.

4.30 p. m. to 5 p. m.

Joint session with Claims Association

Reports of committees:

- (a) Claims-Transportation.

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Meeting held in Greek Temple

Reports of committees:

- (a) Passenger traffic,
- (b) Uniform definitions.

Paper on "Training Men for Supervisory and Executive Positions," by L. C. Bradley, assistant district manager Stone & Webster, Houston, Tex.

3.30 p. m. to 5 p. m.

Joint session with Engineering Association

Reports of committees:

- (a) Transportation-Engineering,
- (b) Block signals,
- (c) Standards (Engineering).

Wednesday, Oct. 11

2 to 5 p. m.

Joint session with Accountants' Association

Meeting held in Greek Temple

Reports of committees:

- (a) Cost of rush-hour service,
- (b) Fares and transfers.

Prepayment systems—General Discussion.

Reports of committees:

- (a) Express and freight traffic,
- (b) Passenger, express and freight accounting.

Thursday, Oct. 12

2 p. m. to 5 p. m.

Meeting held in Greek Temple

Reports of committees:

- (a) Rules.

"Company Publications":

- (a) "Their Use and Value": F. W. Hild, general manager Denver (Col.) Tramway.
- (b) "Their Preparation and Publication": Leake Carraway, Southern Public Utilities Company, Charlotte, N. C.

General discussion.

General business.

Report of committee on resolutions.

Report of committee on nominations.

Election of officers.

Installation of officers.

Adjournment.

#### PROGRAM OF CLAIMS ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2.30 p. m. to 4.30 p. m.

Meeting held in Claims Hall

Convention called to order.

Annual address of acting president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:

- (a) Resolutions,
- (b) Nominations.

Reports of committees:

- (a) Employment,
- (b) Ways and means.

Paper on "Workmen's Compensation Acts," by Roy C. Green, accident department Cleveland (Ohio) Railway.

Written discussion: L. S. Hoffman, general solicitor Public Service Railway, Newark, N. J.

General discussion.

4.30 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association

Meeting held in Greek Temple

Reports of committees:

- (a) Claims-Transportation.



Tuesday, Oct. 10

2.30 p. m. to 5 p. m.

Meeting held in Claims Hall

Paper on "Near Side Stop," by John P. Reynolds, claim agent, Boston (Mass.) Elevated Railway.

Written Discussion: S. B. Hare, claim agent, Altoona & Logan Valley Electric Railway, Altoona, Pa.

General discussion.

Wednesday, Oct. 11

2.30 p. m. to 5 p. m.

Meeting held in Claims Hall

Paper on "Automobile Accidents and Traffic Regulations," by H. G. Winsor, superintendent of investigation and adjustments, Puget Sound Electric Railway, Tacoma, Wash.

Written discussion: A. G. Brown, claim agent, New York State Railways, Syracuse, N. Y.

General discussion.

Thursday, Oct. 12

2 p. m. to 2.30 p. m.

Joint session with Accountants' Association

Meeting held in Accountants' Hall

Reports of committees:

(a) Claims-Accounting.

2.30 p. m. to 5 p. m.

After joint session

Meeting held in Claims Hall

Paper on "Claim Work": (a) "Claim Agent—Past, Present and Future," (b) "Policies and Principles," (c) "Psychology," by E. P. Walsh, attorney United Railways, St. Louis, Mo.

Written discussion: C. G. Rice, assistant to general manager, Pittsburgh (Pa.) Railways, Pittsburgh.

General discussion.

General business.

Report of committee on resolutions.

Report of committee on nominations.

Election of officers.

Installation of officers.

Adjournment.

### Chicago Convention Train Time Changed

A canvass of the members of the A. E. R. A. transportation committee for Illinois and Wisconsin, as well as a number of railway officials in that district, resulted in the change of the schedule of the Chicago special train to the Atlantic City convention. Instead of leaving from the Chicago Pennsylvania terminal on Saturday, Oct. 7, the time will be 11 a. m. Sunday, Oct. 8. The schedule and connections will be as follows:

Leave Chicago .....	11.00 a. m.	Leave Mansfield, Ohio	6.00 p. m.
Leave Fort Wayne,		Leave Canton, Ohio.	7.40 p. m.
Ind. ....	2.30 p. m.	Leave Pittsburgh, Pa.	11.40 p. m.
Leave Lima, Ohio...	3.50 p. m.	Leave Harrisburg, Pa.	6.00 a. m.
Leave Crestline, Ohio	5.30 p. m.	Arrive Atlantic City...	9.30 a. m.

Connections with the "Special" can be made as follows:

Leave Detroit (Michigan Central Railroad).....	11.55 a. m.
Leave Toledo (Pennsylvania Company) .....	2.10 p. m.
Arrive Mansfield .....	4.30 p. m.
Leave Cleveland (Pennsylvania Company).....	5.30 p. m.
Arrive Pittsburgh .....	9.40 p. m.

### Valuation Committee

At a meeting of the American Association committee on valuation held in New York on Sept. 8 a paper by P. J. Kealy on "Overhead Charges in Valuation" was approved as a reasonable statement of one phase of the

general subject. This is the paper referred to on page 280 of the issue of this journal for Aug. 12. It will be presented on Tuesday, Oct. 10. The committee also considered a code of valuation definitions prepared by C. G. Young, of the committee. Twenty-one definitions were adopted for presentation to the convention.

The meeting was attended by J. N. Shannahan, Newport News & Hampton Railway, Gas & Electric Company, chairman; P. J. Kealy, Kansas City Railways; Martin Schreiber, Public Service Railway; B. E. Tilton, New York State Railways, and C. G. Young, consulting engineer, New York City.

### The Association and the Eight-Hour Bill

At association headquarters there have been received many commendations of the work of the committee on federal relations in securing the exemption of electric railways from the burdens imposed by the bill recently passed by Congress. (See issues of the ELECTRIC RAILWAY JOURNAL for Sept. 2, page 404, and Sept. 9, page 461.)

### Entertainment Committee

A meeting of this committee was held in New York on Sept. 14. The entertainment program was considered, the estimate of the necessary appropriation was approved, the sub-committees were appointed and other sundry details were considered. The committee members in attendance were: E. F. Wickwire, Ohio Brass Company, chairman; W. Caryl Ely, Ohio Valley Finance Company; R. F. Hayes, Curtain Supply Company; W. G. Kaylor, Westinghouse Air Brake Company; H. N. Ransom, Westinghouse Electric & Manufacturing Company; J. N. Shannahan, Newport News Railway, Gas & Electric Company; E. P. Waller, General Electric Company; and B. F. Wood, United Gas & Electrical Engineering Corporation. W. T. Stanton, General Electric Company, also attended by invitation.

### Treatment of Fence Posts for Maintenance Work

The American Railway Engineering Association Bulletin No. 187 has just been issued. A portion of the bulletin devoted to service tests of treated and untreated fence posts sets forth the results obtained by the United States Forest Service in co-operation with various state agricultural experiment stations which have been conducting a series of experiments on posts installed from 1906 to 1909.

These tests were conducted at experiment stations in South Carolina, Alabama, Louisiana, Iowa, Minnesota and Maryland. The conclusions drawn as a result of the experiments up to the time of preparing the article show that nondurable species, especially in the South, should have at least a light top treatment in addition to the heavier butt treatment. Brush treatments, soaking in cold-oil and double-tank treatments, where asphaltum was used as the heating media in the hot bath, were not very effective in preventing decay. Charring was apparently of no value, and care must be taken to have the butt treatment extend well up above the ground line. The results clearly indicate that a good open-tank treatment of fence posts with creosote will give satisfactory results in preventing decay in most of the non-durable species. Posts treated with water-gas-tar creosote and water-gas-tar have stood up very well thus far. Those treated with the creosote are in somewhat better condition than those treated with tar.



## COMMUNICATIONS

### Unit for Comparing Track Upkeep Costs

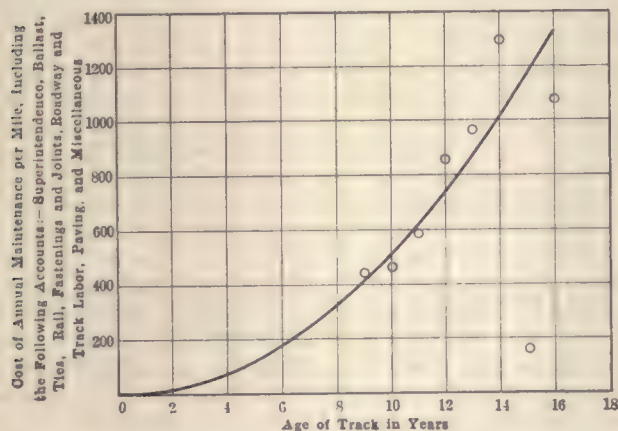
NEW YORK STATE RAILWAYS

ROCHESTER, N. Y., Sept. 7, 1916.

To the Editor:

I note with interest the editorials appearing in your issues of Aug. 12 and Aug. 19 on the subject of "A Unit for Comparing Track Maintenance Costs." This is a very interesting subject and one which, if taken up and developed by the American Electric Railway Association through a committee or sub-committee, should lead to considerable economy in maintenance of track, as it is only through a study of unit costs that more efficient methods can be developed. However, the establishing of a unit cost of track maintenance is a very difficult matter on account of the variables which enter into the problem. My interest in this matter prompts me to set down a few of the ideas which I have on this subject in the hope that others may do the same, resulting in some advance along this line through the interchange of thought.

There are in general three factors which should be taken into consideration in determining the cost of track maintenance. These three factors are as follows: The interest on the original construction cost; the



GRAPH SHOWING RELATION IN ONE INSTANCE BETWEEN COST OF MAINTENANCE AND AGE OF TRACK

Paving, Medina block. Rail, L.S. 107-333 (9-in. Trilby). Ties, untreated oak and chestnut. Ballast, concrete. Joints, electric weld. Traffic during fifteenth year, 111,300 trips city cars, 12,360 trips interurban cars.

annual depreciation or renewal fund, and the actual money spent on labor and materials to keep the track in usable condition during its life. The only costs ordinarily used in comparing maintenance is the third, that is, the cost of labor and materials to keep the track in a usable condition.

There is an old adage to the effect that "A stitch in time saves nine," and this applies to track as well as other things. If money is spent making track repairs promptly there will be considerable life added to the track, and this in turn will decrease the depreciation figure or renewal fund. Thus it will be seen that these two are interdependent and that a comparison of either without considering the other is liable to lead to difficulties. In other words, when maintenance figures are compared the quality of maintenance should be taken into account.

The first factor, the interest on the construction cost,

is determined to a large extent by the type of construction and local conditions, so that it will be readily seen that the total figure which should be used is the sum of this and the other two items, and the engineer should so design his track as to keep the sum of these three items at a minimum under all conditions. Accounting for these three factors necessarily requires that track maintenance be compared on a unit length basis, and the cost per track mile, therefore, will probably be the best unit. The various other factors which affect the life of the track, such as vehicular wear on the pavement, density of car traffic, weight of car, speed and load concentrations, should be taken into consideration in the design of the track.

Let us take, for instance, the third factor, labor and materials necessary to keep the track in a usable condition, and follow this figure through for a period of years on a definite stretch of track. During the early life of this track comparatively little money is expended in its maintenance. As time passes, however, there will be an increased cost of maintenance each year, with the result that after a certain period this item of labor and materials would equal the interest on reconstruction. When this condition occurs, the track should be reconstructed. This, of course, assumes a rather ideal condition in which there is no interference from city authorities or others having some jurisdiction over the track in question.

If the annual amounts expended each year were plotted as ordinates and the years as abscissas there would result a curve which might be called the characteristic curve of maintenance. This curve, of course, would vary with the different track conditions, with the increase in traffic, design of track and other factors. A curve of this kind is illustrated in the accompanying diagram, which was taken from an actual example. It will be noted from this curve that variation in maintenance methods can be made which will materially alter the curve. For instance, during the fourteenth year of the life of the track in question, a little more money was spent than usual, with the result that during the fifteenth year there was a considerable decrease. This particular decrease was due to a change in the method of maintenance and illustrates the advantage of repairing track by the use of offset plates and a grinder. It will be noted from this curve too that the actual amount of money spent per mile during any particular year has little bearing on the average track mile unit cost of maintenance.

It would seem, therefore, that the only fair basis of comparison would be on the average cost of maintenance per year during the entire life of the track, or in order to compare various stretches of track which were not worn out it would be necessary to compare the accumulated maintenance to date, to which should be added information as to the type of construction, kind of traffic, etc. It would be almost impossible to lump the various factors represented by traffic conditions unless the number of revenue seats operated over this track during its entire life were used to make a comparison. The immense amount of clerical work necessary to accomplish this result would make it very difficult if not impractical. It might be well to add that the reason for selecting the revenue seat basis of comparison is that it takes into account the general efficiency of the operation of the road, and eliminates a large part of the variables.

Should it be advisable to compare the maintenance of track on the mile per year basis, it would probably be well to separate the paving maintenance from that which pertains directly to the track, as frequently types of pavement are required by city authorities which are not suitable for track construction. This



would also eliminate one of the variables, which is vehicular traffic on the street. In order further to compare track, it will be necessary to subdivide the types of construction, such as, open track on interurban and suburban lines, and sub-surface track in paved or unpaved streets.

It might be of interest here to call attention to an empirical formula which has been developed and used by this company and found to approximate closely the maintenance conditions in this city. This formula is as follows:

$200 + (31\frac{1}{2} \times \text{the average number of cars per hour (taking the entire year as a basis)}) = (\text{in dollars}) \text{ the average annual maintenance per mile of track in paved streets.}$

The average annual maintenance in this case is the total accumulated maintenance divided by track life.

While this formula would undoubtedly not meet all of the conditions in the various cities, nor does it meet all of the conditions here, it has been found to give approximate results in a number of cases.

The foregoing analysis is given merely to indicate something of the study which must necessarily be given to a subject before any definite conclusions can be drawn regarding what would constitute a fair unit cost of maintenance for track. At the present day there is not a successful manufacturer who does not investigate his unit costs, and inasmuch as railroading is the manufacture and sale of transportation, it is certainly necessary to determine the various units which go to make up the costs of manufacturing transportation. I therefore, heartily commend your efforts along this line.

D. P. FALCONER,  
Engineer Maintenance of Way.

NEW YORK STATE RAILWAYS  
SYRACUSE, N. Y., Sept. 6, 1916.

To the Editors:

Your recent editorials on the subject of a "Unit for Comparing Track Maintenance Costs" are very interesting and cover the subject in most of its phases. The cost per track-mile seems to me to be the proper unit if all physical and operating conditions are taken into account. It would be necessary, of course, to classify it into open track, track in dirt streets and track in paved streets, and then take into account types of construction, amount and speed of traffic, and any other conditions which may affect the maintenance cost.

In a paved street it does not seem to be advisable to separate the pavement from the track, as generally the repair of one necessitates the repair of the other and the two should be considered as a complete structure. Pavement maintenance costs, however, should be kept as a matter of information. If track is placed in a paved street and cars are not operated over it, the maintenance on the pavement would be practically little more than the same pavement in a street without the car track, unless the vehicular traffic is very heavy.

In comparing track maintenance costs, the question of the degree of maintenance is an important consideration. In general, the maintenance is based on an arbitrary percentage of the receipts rather than on the fact that "a stitch in time saves nine," a basis which would be more satisfactory to maintenance engineers. The mechanical and electrical departments have entirely different problems to deal with. Cars are pulled in and overhauled at stated intervals and thus kept up to a certain standard, while, on account of the high cost of work in streets, a way engineer would not be permitted to excavate and examine joints and ties for defects at stated intervals. Track repairs are generally not made until they are absolutely necessary, with the possible

exception of grinding joints. On open track construction the problem is more simple. Track walkers keep joint bolts tight and spikes driven, and generally an inspection of ties is made twice a year. Incidentally, I believe the inspection method to be more efficient and economical than arbitrarily to renew so many ties a year, based on some average figures or assumptions.

In general, it is not as practical to standardize the maintenance of civil engineering structures as it is mechanical and electrical, on account of the mileage of territory covered, physical conditions and the construction and maintenance being subject to the whims of public authorities and the public in general.

E. P. ROUNDEY,  
Engineer Maintenance of Way.

THE DENVER CITY TRAMWAY COMPANY  
DENVER, COL., Sept. 8, 1916.

To the Editors:

I have always believed a unit to measure track maintenance efficiency was necessary. Although the many types of track construction and various classes of paving used seem to make this difficult, it must be remembered that many large manufacturing establishments have made time studies and compiled cost records of all sorts and kinds of work. Hence, it would seem that the problem confronting the way engineer should be capable of solution.

Possibly one reason that greater progress has not been made in the development of these scientific data is that there has been too much "cut and try" in track building and maintenance. We have developed track foremen largely from laborers, and they have had to get their education by hard knocks and experience. They have, as a rule, done wonderfully well, but how much better would they have done had their training been "planned" for them and had they, in most cases, been recruited from sources where brain and brawn were at a balance instead of brawn tipping the beam.

We have heard maintenance of way engineers severely criticised for their maintenance costs per mile of track, but after conditions were investigated the person criticised has been found to be doing very well, all things considered. Many times I have seen unit costs prepared on a mile of track basis that covered only certain items whereas those of other companies, supposed to cover the same work, included other items properly chargeable. I believe that cost figures for comparative purposes should be made up for each type of rail, joint, tie, ballast, paving base and paving wearing surface installed, that a sketch showing a cross-section of various combinations of these be included with the cost figures and that a statement covering the character of the charges put through to make up these costs. The cost and amount of materials used as well as the hours of labor and rates of pay should be very carefully shown. I cannot see any other way of arriving at figures that can be used to compare one property with another or one man's ability with that of another.

I can hear a great many engineers saying: "Lord! What a mass of detail such a scheme involves," and perhaps for that very reason it will not be worth doing. But if manufacturers, compelled by keen competition find it advantageous to know what they are doing, why should not the street railway company that is a victim of the "shrinking nickel"? I firmly believe this is a matter that should take up the time of a committee on costs and cost finding, and that it can be adjusted in no other manner.

I trust that this whole matter will be aired in your columns in a real constructive way.

EDWARD A. WEST, Chief Engineer.



# Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Experience with Removable Trolley Shoe—Headlight of Novel Type—Grinding Joints for 40 Cents on the Boston Elevated—Improved Yoke for Conduit Railway in Washington, D. C.—Electric Track Switches in New England—Getting Lighting Arresters Ready for Season of 1917

## Improved Yokes for Conduit Railway Old-Type Yokes Being Replaced by New to Withstand Modern Street Traffic

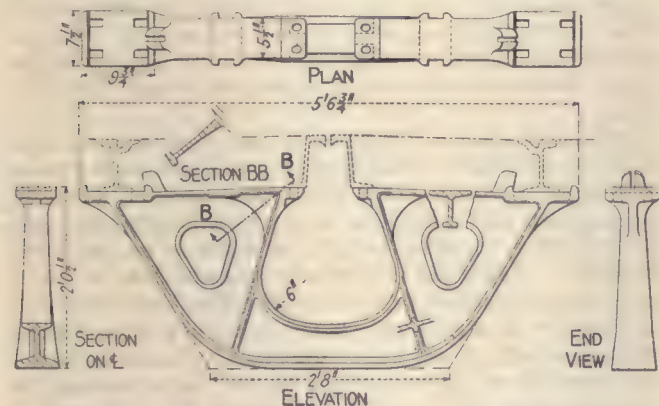
BY C. S. KIMBALL

Engineer Way and Structures Washington Railway & Electric Company, Washington, D. C.

As there are so few conduit railways in the United States one hears very little of the problems of the engineers connected with these lines. It may be of interest, however, to the readers of the *ELECTRIC RAILWAY JOURNAL* to know that the yokes which are now being used in new track and on existing track wherever necessary to replace those broken in service, or whenever there is

ago, there has been a very considerable increase in the weight of equipment which it is called upon to carry. While the old yokes have in general given excellent service, a number have failed in recent years due to breakage near the middle, their weakest part. In these yokes there is no direct support under the rail, whereas in the new type there is a broad, flat base  $4\frac{1}{2}$  ft. wide which sets much more securely upon the foundation.

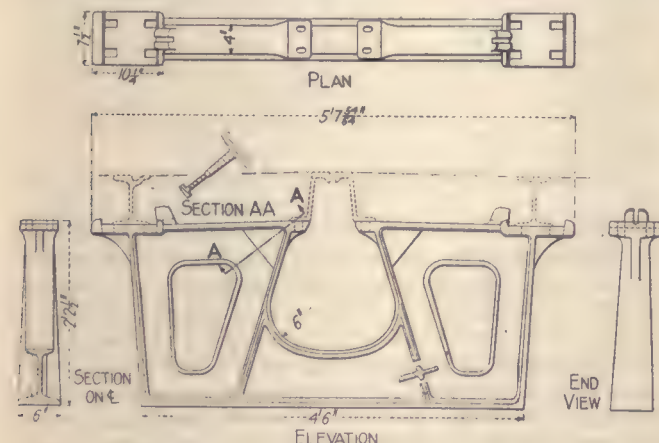
The new yokes weigh about 500 lb. as compared with 350 lb. in the old type, and they are of a good quality of gray cast iron. They are molded at present at the foundry of Davis & Thomas in Catassauqua, Pa.



CONDUIT YOKE FORMERLY STANDARD WITH WASHINGTON RAILWAY & ELECTRIC COMPANY, WASHINGTON, D. C.

an opportunity to substitute a new yoke for an old one, are radically different in design from those which still support the larger part of the track in Washington, D. C.

The differences between the old and the new design are clearly shown in the accompanying drawings. Since the original track was installed, more than twenty years



NEW CONDUIT YOKE DESIGNED TO WITHSTAND MODERN HEAVY STREET TRAFFIC

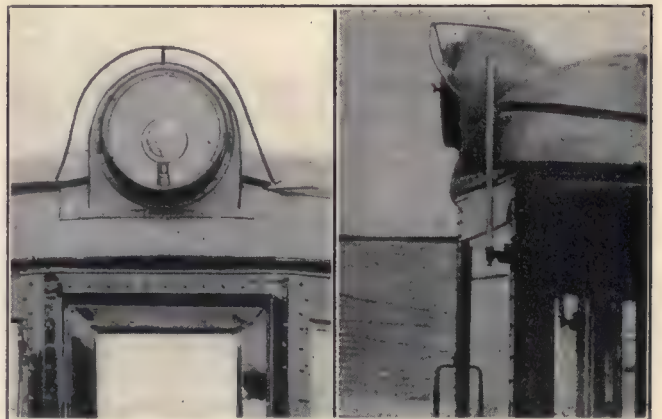
## Headlights Recessed in Car Roof

New Design of Headlight Proves Satisfactory for High-Speed Road

BY JAMES W. BROWN

Superintendent of Shops Wilkes-Barre & Hazleton Railway and Lehigh Traction Company

Recessed headlights have been used on the new equipment of the Wilkes-Barre & Hazleton Railway and of the Lehigh Traction Company and have given complete satisfaction. Owing to the high speed at which these interurban cars are operated, it was desired to place the headlights in such a position that the light would project a considerable distance farther than the braking distance. It was also desired to place the headlight



HEADLIGHTS RECESSED IN ROOF OF CAR ON WILKES-BARRE & HAZLETON RAILWAY

where it could not be reached easily or broken. The illustration herewith is of the GE Form J-28 headlight which has been installed on this equipment.

These headlights are recessed in a hood at each end of the roof and covered with a sheet steel housing. They are equipped with a dimmer, consisting of resistors wound on insulated porcelain tubes and enclosed in a steel frame placed underneath the car.

This stationary headlight has done away with a great deal of trouble and annoyance that was experienced with the old headlights in carrying them from one end of the car to the other. Now a trainman has only to



turn off the snap switch at one end of the car and to turn on the one at the other end. These new headlights have not given us any trouble up to the present time and all that it has been necessary to do so far was to clean the glass in the hood.

## Installation and Maintenance of Car Lightning Arresters

The Author Describes Types of Arresters and Their Location on Top and Underneath Cars

BY R. H. PARSONS  
Electrical Foreman

As winter approaches the question of lightning arresters should be a prominent one in the minds of railway superintendents, master mechanics and, last but of course not least, lightning arrester manufacturers.

In the first place all arresters should be put in good condition before the summer storms commence. Winter is the proper time for lightning arrester inspections, tests and renewals. During the course of such inspections it will be found that many arresters are so badly damaged as a result of the storms of the previous summer as to necessitate complete replacement. In making such replacements the type of arrester best adapted to local conditions should be chosen for it must be borne in mind that the best is none too good.

There are nearly as many types of lightning arresters as there are types of cars and of course each master mechanic has his favored or disfavored type and

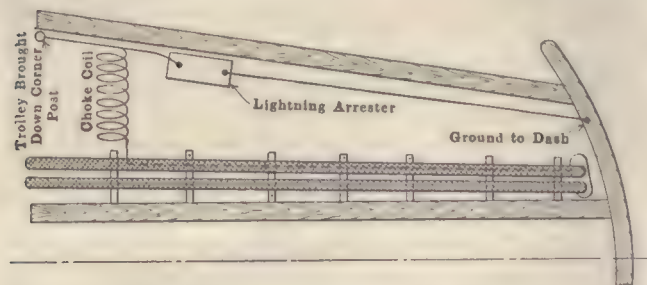


FIG. 1—ARRESTER UNDERNEATH THE CAR—WIRING LAY-OUT FOR OLD CARS

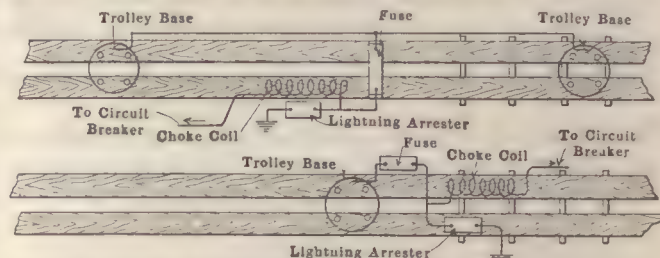
each manufacturer is sure his arrester is best. It seems worth while, therefore, to point out a few of the practical considerations other than those pertaining to operation which should be taken into account in the selection of new arresters.

To facilitate mounting, an arrester should be rugged and compact. It is desirable that it be adapted to mounting in any position or location, and that the labor of mounting be a minimum. Also the arrester should require very little care and attention and to facilitate inspection should be so designed that it can readily be tested in service. Of course the first cost should be reasonable. Naturally, an arrester that will fulfill all requirements is hard to find.

The function of the lightning arrester is the protection of electrical equipment from damage by lightning. The desired result is ordinarily obtained by providing a by-path, consisting of one or more spark gaps in series with a resistance, connected between trolley and ground. The gaps do not permit discharges to take place at the ordinary line voltages but offer little resistance to the high voltage lightning disturbances. The line voltage, however, tends to maintain the arc across the spark gaps after it has once been started by the high voltage discharge and it is in the means of preventing or de-

stroying this arc that manufacturers differ so widely in their methods of construction.

The trouble with the earlier types—and with some of the later types for that matter—was that the voltage at which the arrester would start to discharge was higher than the breakdown voltage of the armature and field insulation, with the result that motor windings were usually damaged before the arrester got into action.



FIGS. 2 AND 3—ARRESTER ON TOP OF THE CAR—WIRING LAY-OUTS FOR TWO TROLLEY AND ONE TROLLEY BASE EQUIPMENTS

It will be borne in mind that the insulations of a few years ago were not barriers against voltages of 3000 or 4000, and that the lightning arresters of that time were not designed to carry off static at voltages lower than these. It might be mentioned here also that the proper point to set a lightning arrester at the present time is only a little above the line voltage, the common practice among street railways that give proper attention to their arresters being in the neighborhood of 1000 volts.

Among the newer arresters on the market, the aluminum cell or electrolytic type is accepted as the most efficient of all devices for protection against lightning. The electrolytic arresters built by the different companies differ in construction but operate on the same principle. This type of arrester depends for its operation on the peculiar properties of a film deposited electrolytically on aluminum trays. This film prevents the flow of current at normal voltages, but offers a free path for currents at high voltages or for static discharges. Upon cessation of the abnormal stress the film regains its original resistance instantly. This arrester is conceded to be the best on the market for protection when it is in perfect condition. It is especially well adapted

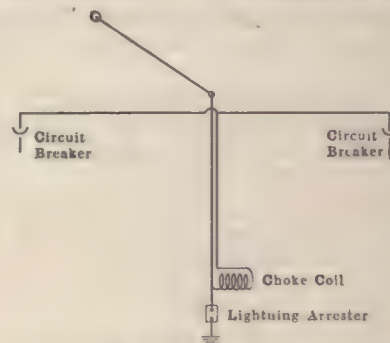


FIG. 4—FAULTY ARRANGEMENT OF CAR WIRING

for station use, where it can receive the attention ordinarily given storage batteries. It has been recommended by one manufacturing company for pole and car use, but for both these uses the following objections are found: The arrester must be removed and stored during the winter; it takes up more space on a car than can ordinarily be spared; it is practically impossible to place the arrester on the roof of a car; if placed underneath the car body it is subjected to dust and wheel wash; the class of men ordinarily found in carhouses are neither skillful enough nor careful enough to give it the



attention it would require for car service. If this arrester were kept in proper condition there is no question as to its usefulness, but if neglected, it would be far inferior to other types. It is also a question if it would survive the bumping and bouncing over rough tracks. The high cost is a further deterrent to its adoption for car work.

Although much depends upon the type and adjustment of the lightning arrester used, more depends on its condition, location and general relation to the car wiring. A lightning arrester would be useless without a choke or kicking coil, which in turn would be equally as useless if not properly placed.

It is the opinion of those who have given the question much study, that the proper place for both choke coil and lightning arrester is on the roof of the car, and as near the trolley base as possible. One reason for this is the simplicity and efficiency of the wiring. There is no doubling back of the trolley lead, and the path for the lightning discharge is direct. The arrester on the roof is, of course, subjected to the full force of the rain, but clean, pure water is not harmful, especially as the delicate parts of the arrester can be easily protected. The rain runs off quickly, and when the sun shines again the arrester is soon dry. On the contrary, when placed underneath the car it is subjected to water, mud and dust, and is not in a position where it will dry if it becomes wet.

When located in the car it has the advantage of accessibility (perhaps) and protection from the elements, but the time a lightning arrester is particularly useful is during a thunder storm, and a lightning arrester working is apt to make some noise. Not infrequently during a heavy discharge a lightning arrester is blown up, commonly speaking, and it would be at just the time when passengers are nerved up on account of the storm that this would occur. The considerations of safety and comfort to passengers, therefore, oppose the placing of the arrester inside the car. Often the lack of head room prevents the location of the lightning arrester on the roof. In such cases it should be placed underneath the car.

A sketch, Fig. 1, is here shown of the wiring of the lightning arrester and choke coil on old type cars wired with canvas covered cables. The ground wire can be run to the dash, which is connected mechanically to the bumper, side sill, bolster or side bearings, and thence through the trucks to ground. Satisfactory wiring layouts for the lightning arrester circuit where the arrester is located on top of the car are illustrated in Figs. 2 and 3.

A few rules to be observed in the installation and care of lightning arresters are:

The wires in the lightning arrester circuit should be as straight and free from bends and sharp turns as possible, and should be securely connected to the nearest ground. If there must be kinks in the wiring make them in the trolley circuit.

When the lightning arrester is located underneath the car the trolley lead where it is run down the corner post or other similar place should not be placed near the wiring of other circuits.

Kicking coils should be made on spools at least 5 in. in diameter, and should have at least ten turns—a larger number is better. The old-time choke coils 2 in. in diameter were a mistake.

The wire used in the lightning arrester circuit should be No. 6 B & S or larger.

The connection of the fields to the trolley end and the armature to the ground end of the motor circuit will be found effective in saving armatures from damage by lightning.

Cutting in the lights during a storm will give a greater number of easy paths for lightning discharges, and at the expense of a light socket or lamp will often save the motor equipment.

Avoid carefully all conditions similar to that in Fig. 4. This sketch illustrates one of the disadvantages of placing the arrester underneath the car.

## Electric Track Switch Practice

### Features of Installation and Maintenance on Two New England Railways

The Boston Elevated Railway has about 300 Cheatham electric track switches on its system. There are also eight Collins electric switches which have been installed comparatively recently.

During the past three years thirty-one new automatic switches have been installed, and additions are being made from time to time as the volume of traffic at junction points warrants the expense. The other factor which determines the advisability of installing a switch



MOTOR-OPERATED TRACK SWITCHES AT THE BUSIEST CORNER IN NEW ENGLAND

of the automatic type is the amount by which the movement of traffic would be facilitated. On the Elevated Railway trunk lines the use of electric switches is becoming standard practice, as the cost of operating hand switches, together with the delay to traffic, makes the use of them uneconomical, the total extra costs easily exceeding the maintenance costs for electrically-operated units.

The question whether an electric switch shall be installed to supersede a hand-operated switch is finally decided by the division superintendent. He makes the recommendation, which is passed upon by the superintendent of transportation or the superintendent of traffic, or both in conjunction. The question of these switches is finally decided by the superintendent of wires.

Maintenance is divided between the maintenance of way department and the wire department. The former renews the links and lugs only; the latter cares for the electrical connections to the links, including the plungers.

The Collins switches of the U. S. Electric Signal Company, as recently installed, are equipped with small motors, which give a slow motion to the switch and prevent splashing in wet weather. These are installed at locations where there are many pedestrians crossing. Two are on Washington Street at the intersection with Summer, the "busiest corner in New England." In this equipment the switch cannot be thrown between the trucks of a car by a following movement under the



contactor; the street box is automatically sealed and is not dependent on the proper making up of pipe joints or gaskets; a positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are small and are mounted on standard ears; and standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

Cheatham switches are located at many points throughout the system. Some are placed in the loops at carhouses, where a large number of prepayment cars with trailers are handled. Three are at Arlington Heights loop (where a prepayment area is to be established), and three at the Watertown carhouse. It is probable that electric switches will be installed at storage turnouts in all loop tracks, as they facilitate the



SOLENOID-OPERATED TRACK SWITCHES AT COPLEY SQUARE, BOSTON, MASS.

handling of cars running on five-minute headway or less.

Maintenance costs of Cheatham switches for eleven months ending June 1, 1916, are as follows:

On surface lines, outside subways, 278 switches, total for labor and materials.....	\$2,775.78
In subways north, ten switches, total for labor and materials.....	37.22
In subways south, three switches, total for labor and materials.....	13.39
In Boylston Street subway, one switch, total labor and materials.....	12.69
Total for 292 switches.....	\$2,839.08
Average.....	9.72

The Bay State Street Railway, Boston, Mass., has twenty American automatic switches, four Collins automatic switches, both the product of the United States Electric Signal Company, seventeen Cheatham and three Squires electric track switches. These switches are at important junction points, in the following cities and towns, where main lines converge: Boston, Chelsea, Revere, Haverhill, Lawrence, Lynn, Salem, Saugus, Everett, Malden, Lowell, Fall River, Quincy and Weymouth. All the Cheatham switches are of the quick-moving type.

The location of an electric switch is determined by the general superintendent, often on the recommendation of the division superintendent. It is probable that several new units will be installed this year on the Bay State system, though none have been ordered as yet.

In the dispatcher's telephone equipment of the interurban division of the Iowa Railway & Light Company at Cedar Rapids, Iowa, phonograph horns are attached to the transmitter and to the receiver. It is thus possible for the dispatcher to sit at his desk and use the telephone without being hindered by ear pieces and cords.

## Trolley Shoe Practice

### Results of Experience with New Overhead Contact Device Are Given

Less than six months ago the development of the Miller trolley shoe made the principle of the sliding contact for the collection of current applicable to cars using the ordinary trolley poles. The April 29 issue of the *ELECTRIC RAILWAY JOURNAL* described this shoe, which is manufactured by the Miller Trolley Shoe Company of Boston, Mass., and announced that it had just been placed on the market. The shoe is now in use on more than sixty electric roads. Among the lines on which it has become standard are the Portland & Lewiston Interurban Railway, the Central Maine Power Company, the Lehigh Valley Transit Company (interurban service), the & Jacksonville Railway, (interurban and locomotive service), the Alton & Jacksonville Railway, Chicago & West Towns Railway, Tri-City Railway and the Chicago, Harvard and Geneva Lake Railway.



VIEW OF TROLLEY SHOE

The advocates of the Miller shoe state that it clings to the wire giving excellent contact and practically eliminating the noise, vibration and arcing that are common with the ordinary trolley wheel, and it is said that with much less tension on the trolley pole, it has been possible to increase the speed around curves where trouble was formerly experienced with poles leaving the wire.

Many of the roads which have adopted the trolley shoes first put them on the cars which were operated in high-speed service, the Lehigh Valley Transit Company being a typical example. Harry Branson, superintendent of equipment of this road, has installed them on the cars operating on the limited service between Allentown and Philadelphia, Pa. On this service it has been reported that the trolley shoes have averaged more



CAR EQUIPPED WITH TROLLEY SHOES IN LIMITED SERVICE BETWEEN PHILADELPHIA AND ALLENTOWN, PA.



than 10,000 miles of service before having to be replaced.

Railway men who are unfamiliar with this shoe raise the question of the wear of the trolley wire when the sliding contact is mentioned. Micrometer measurements made by the railway above cited, however, indicate no additional wear on the wire.

## Prepared Blocks and Wedges Speed Up Track Leveling

The accompanying illustrations show the reconstruction of tracks on the lines of the Northern Ohio Traction Company in Akron, Ohio. In this construction work the rails were laid on International twin steel ties embedded in concrete, which forms the foundation for the paving brick. In order to facilitate the work of



WORKMEN LEVELING TRACK IN AKRON, OHIO

leveling the track, the company used special blocks and wedges made by The Steele-Alderfer Company, Cuyahoga Falls, Ohio. The blocks measure 6 in. x 8 in. x 8 in. and the wedges 2 in. x 4 in. x 8 in., tapered on one size, hardwood being used for both.

Track levelers often use for this purpose rough blocks and wedges chopped out of any available material. If the material is knotty or crooked-grained, considerable time is required to make wedges that will serve the purpose. Thus the men have to stop at short intervals to cut out a new supply of wedges. This waste of time is eliminated by the use of the prepared blocks and



TRACK WORK COMPLETED AND READY FOR PAVING BLOCKS

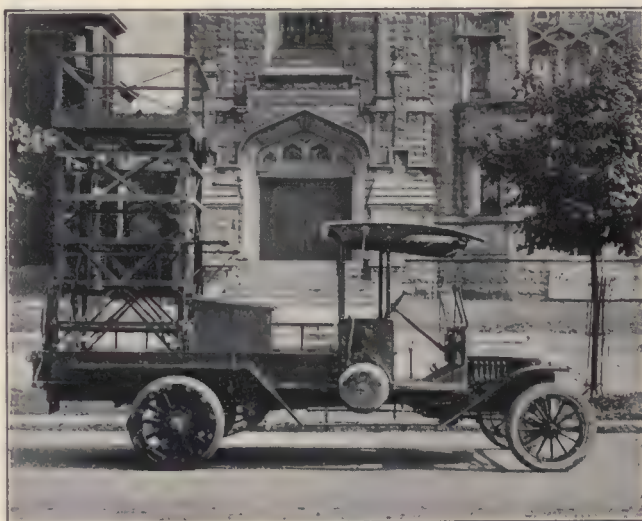
wedges. The blocks are laid underneath the rail and the wedges are inserted on either side. Two men then drive in the wedges until the rail is level.

## New Louisville Line Truck

Railway Finds One-Ton Truck Is Rugged and Speedy and Efficient in Hilly Country

An automobile line truck has recently replaced an old-style wagon and eight mules in Louisville, Ky. It is used by the Louisville Railway motive power department, of which Frank H. Miller is superintendent. The outfit consists of a line tower mounted upon a truck which is manufactured by the Smith Form-a-Truck Company of Chicago, Ill. This truck uses the Ford automobile chassis as a power plant, and slips over the frame, reinforcing it throughout the entire length. The Ford rear axle is used as a jackshaft, on which are mounted two sprockets for the double chain drive to the rear wheels. Solid tires having a 3½-in. tread are used on the rear wheels and the front wheels have pneumatic tires on demountable rims.

As shown in the accompanying illustration, the tower itself is built on the rear of the truck. It is made in two parts, the upper section of which is capable of being raised and lowered to suit the work which is being done. The maximum height above the ground is



LIGHT AND SPEEDY LINE CAR USED BY LOUISVILLE (KY.) RAILWAY

15 ft. 8 in. and the minimum 10 ft. An 8-ft. ladder is carried for extra high work or for going down into manholes. Mounted on the side of the car is an 18-in. single stroke warning gong, which is operated by a rope which hangs over the driver's seat.

Some years ago the Louisville Railway undertook to use automobile line trucks, but for their service the types available were unsatisfactory, and they were given up. The truck described above, however, has given excellent satisfaction. It is ready for service at any time and for emergency repair work it has been found especially efficient. The weight of the truck is 4600 lb. complete, including two men, material, tools, etc. It will carry an overload of about 50 per cent of its rated 1-ton capacity.

The Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill., has placed a large American flag in electric lights over the three-story station and general office building in Champaign which it occupies jointly with the Illinois Traction System.





MOTOR TRUCK OF STEAM MOTOR CAR SHOWING MOUNTING OF ENGINE

## Steam Motor Car Used by Vermont Railroad

**All-Steel Passenger Car with Smoking and Baggage Compartments Is of Excellent Design**

The White River Railroad of Vermont is operating between Bethel and Rochester a steam motor car, the construction of which represents a distinct advance in the development of railway motor cars. The route between Bethel and Rochester, about 20 miles in length, passes through the White River Valley, which is one of the many beautiful sections of New England. Rochester itself while not a large city is a progressive trading center for a considerable population living in the surrounding towns. The new car is an important addition to the railway service of this locality. It is the product of the Unit Railway Car Company of Newton, Mass., which is affiliated with the Stanley Motor Carriage Company of Newton, manufacturers of steam automobiles.

The car body was constructed by the Laconia Car Company in Laconia, N. H. It is about 50 ft. long, and seats forty-four passengers. The front end of the car has a baggage compartment, a smoking compartment, and the motorman's cab. The car has plush seats, electric lights and the standard equipment required by the Interstate Commerce Commission. The accompanying illustrations show the general appearance of the car, the seating arrangements and the motor truck.

One of the unique features of the car is its power plant. The steam is generated in a vertical fire-tube boiler, comprising about 600 tubes, each  $\frac{3}{4}$  in. in di-

ameter. The working steam pressure is 500 lb. per square inch. Kerosene is the fuel used, the flow being controlled automatically by the boiler pressure.

The engine is a single unit connected directly to the driving axle by spur gears. It is of the two-cylinder, double-acting, simple type which has been developed for automobile use by the Stanley Company. The rating is 60 hp., by which is meant the power which can be delivered continuously to the rims of the driving wheels. The reserve power is such that 200 hp. can be developed for starting, acceleration or climbing hills. The car is capable of a sustained speed of 45 m.p.h.

From the engine the steam passes to the condenser, which is of the automobile radiator type. There is only a small loss of steam, so that the 150 gal. of water carried is sufficient for 1000 miles. In ordinary service the car runs about 5 miles per gallon of kerosene.

It is believed that this type of car has a field in developing traffic on branch lines and lines where the present patronage does not warrant electrification. It has also been offered as a possible solution of the "owl car" problem.

## New Interlocking Machine for Pacific Electric Railway

The Pacific Electric Railway is installing an electro-pneumatic interlocking machine in its terminal at Sixth and Main Streets, Los Angeles, Cal. The machine will have a twenty-three-lever frame, consisting of eight signal levers, ten switch levers with standard detector circuit equipment and five spare levers. This machine will be provided with sectional route locking, and an illuminated track diagram will be mounted directly above the levers. Two element 50-cycle vane relays will be used in connection with the detector circuits. A total of nine two-position and eleven three-position light signals will be used in this installation. In the train shed the light signals will be suspended from the elevated structure. A special feature in the design of these signals is the use of lenses in the side of the light housings whereby the motorman is able to observe the indication even though he be directly opposite the signal. The background of these signals is shaped so as to prevent all direct light from shining through the side lenses and giving a false indication. The contract for the material for this installation has been awarded to the Union Switch & Signal Company.



INTERIOR VIEW OF STEAM MOTOR CAR SHOWING SEATING ARRANGEMENTS; EXTERIOR VIEW



## NEWS OF ELECTRIC RAILWAYS

### MR. WHITRIDGE DEMURS

**Files with the Governor a Letter Taking Exception to the Public Service Commission Holding Him to Accountability for Strike**

Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., has made public a letter which he wrote on Sept. 1 to Governor Whitman of New York dealing with the letter addressed previously to the Governor by Chairman Straus of the Public Service Commission, in which the chairman gave an account of the activities of the commission in connection with the first of the recent strikes in New York. The commission in its original finding placed the blame for the strike on Mr. Whitridge. Mr. Whitridge was then abroad. He now takes exception to the conclusions of the commission. His letter to the Governor contained copies of his correspondence with Mr. Stevens, then chairman of the Second District Commission, in which he took exception to the last seven lines of the public statement of Mr. Stevens to the newspapers with respect to the conditions of the strike settlement of 1913 in Yonkers. He then characterized these lines as erroneous and as containing a further expansion of what he said, to which he did not assent. His letter of Sept. 1, without this correspondence, follows:

"I was yesterday, Aug. 31, shown a copy of letter addressed to you by Oscar S. Straus, dated Aug. 10, giving an account of the activities of the Public Service Commission during the previous month and saying that that commission had learned important lessons which they hoped to utilize for imposing further legislation.

"This letter is largely taken up with a discussion about me and what I have done and left undone. The commission has not hesitated to say that:

"There can be no question that the strike on the Yonkers and Westchester lines and the events which followed in the train of this strike, including the strike on the other branches of the Third Avenue Railway and the threatened difficulties with the lines of other companies throughout the city, came about as the immediate and logical result of the attitude of Frederick W. Whitridge, president of the Third Avenue Railway, and the actions he took in the matter proved conclusively that he either intentionally violated the agreement he had made with the men to arbitrate and which he was in honor bound to keep, or that he was so negligent in his duties to his stockholders, his employees and the public, as to forget entirely this important agreement."

"The notion that I had the power to loose or bind the forces of destruction and disorder, which have broken out in this country within the last few weeks, even though I had been here, instead of 4000 miles away, is sufficiently absurd on the face of it, but in consequence of the declaration I have quoted, some of the newspapers and some of the public have got it into their heads that I have deliberately violated a contract or agreement to arbitrate all the differences with my employees. That is an odious charge. I resent it and it is not true. I say to you that I have never made any such agreement, that no such agreement now is or ever was in existence, and nobody, so far as I know, ever pretended that any such agreement did in fact exist down to the time of this declaration of the Public Service Commission. In the absence of any formal agreement, which the commission did not dare even in my absence to allege, they produced a stenographer's report of a conference, which I had with F. W. Stevens, chairman of the Public Service Commission of the Second District, in 1913, and undertook to spell a contract out of that report which had laid under the dust for nearly four years without having been heard from. The conference was held for the purpose of inducing the Yonkers men, who had been on strike, to return to work, and for no other purpose. That object was accomplished largely through the tact of Mr.

Stevens, and to assist him I agreed to arbitrate certain things under certain conditions, if it became necessary. It did not become necessary because the men had no grievances which they wished to arbitrate. What I said about arbitration at that time related to the settlement of the Yonkers strike in 1913, which we were then discussing, and did not relate to anything else or to anything which had occurred or which might occur in 1914, 1915, or 1916, and nobody ever pretended it did.

"After the conference was over, copies of this stenographer's report were sent to the men. It was not sent to me. I did not initial it and to this day I have never seen it, but a day or two after the meeting, I saw a newspaper report, in consequence of which I telegraphed exceptions to Mr. Stevens.

"The endeavor to spell a permanent agreement for arbitration out of the stenographer's minutes upon this state of facts, I do not care to characterize, although the commission's remark that 'we have already developed the fact' throws some light upon their mental processes. Still less do I wish to enlarge upon the manner in which the stenographer's minutes were used at recent hearings.

"I understand from Mr. Cook, our counsel, that his complaint of the procedure of the commission was made to it directly, and Mr. Maher, whose testimony was not completed, informs me that his position has not been correctly or fairly represented."

### WAGES UNDER INDIVIDUAL CONTRACTS IN NEW YORK

The schedule of wages of trainmen of the New York (N. Y.) Railways contained in the individual working contracts referred to in the *ELECTRIC RAILWAY JOURNAL* for Sept. 9 are based on a ten-hour day. The rates for conductors on the electric lines are as follows: First year, \$2.60 a day; second, third and fourth years, \$2.90 a day; fifth and sixth years, \$3.10 a day; seventh, eighth, ninth and tenth years, \$3.20 a day; eleventh, twelfth, thirteenth, fourteenth and fifteenth years, \$3.30 a day; sixteenth year and thereafter, \$3.40 a day. The rates for motormen on the electric lines are as follows: First year, \$2.60 a day; second, third and fourth years, \$2.90 a day; fifth and sixth years, \$3.10 a day; seventh, eighth, ninth and tenth years, \$3.20 a day; eleventh, twelfth, thirteenth, fourteenth and fifteenth years, \$3.30 a day; sixteenth year and thereafter, \$3.40 a day. The rates for conductors on the storage battery lines are as follows: First year, \$2.60 a day; second year, \$2.70; third year and thereafter, \$2.80. The rates for motormen on storage battery lines are the same as those for conductors on these lines. The rates for conductors on the horse car lines are \$2.50 a day for the first year and thereafter. The rates for drivers on these lines is \$2.50 a day for the first year and thereafter.

Clockmen are to receive \$2.50 a day for the first year and \$2.60 the second year and thereafter. Terminal men are to receive \$2.50, \$2.80 and \$2.95. General inspectors are to receive \$3.75. Truck inspectors are to receive \$3.50, and line inspectors are to receive \$3.50 a day and \$3.60 a day. Starters are to receive \$2.90 a day, \$3.00 a day, \$3.20 a day and \$3.60 a day. Switchmen and flagmen are to receive \$1.95 a day, \$2.00 a day, \$2.20 a day, \$2.30 a day and \$2.50 a day. Road and school instructors are to receive \$3.15 a day, \$3.65 a day and \$3.90 a day. Register inspectors are to receive \$2.50 a day. Janitors are to receive \$2.00 a day. On storage battery and horse car lines inspectors are to receive \$3.10 a day, starters are to receive \$2.70 a day, \$3.00 a day and \$3.10 a day. Switchmen and flagmen on these lines are to receive \$1.95 a day. Janitors on these lines are to receive \$2.00 a day. Truck and car drivers attached to these lines are to receive \$1.95 a day, \$2.05 a day, \$2.20 a day and \$2.30 a day.



## BANGOR STRIKE DECLARED OFF

The motormen and conductors of the Bangor Railway & Electric Company, Bangor, Me., who went on strike on Aug. 26, voted late on Sept. 9 to declare the strike off. The company had made no promises or concessions, and the strike was a complete failure on the part of the Amalgamated Association of Street & Electric Railway Employees of America. The company has reinstated about twenty men who went out on strike. These men conducted themselves properly during the period of the strike. They were re-engaged as new men, however, and have started in again with the company at the foot of the list.

As previously stated in the *ELECTRIC RAILWAY JOURNAL*, the service of the company had been practically normal for some time past despite unusual demands made upon the company for transportation. On the night of Sept. 8 Charles E. Hughes, the Republican nominee for President, spoke in the Auditorium, located about a mile from the Public Square in Bangor. Besides the other regular service the company that day maintained a two-minute schedule from the center of Bangor to the Auditorium. The cars on this run in particular were crowded to capacity.

Public sentiment on the side of the company increased steadily. At first the police were inclined to be somewhat lax in affording proper protection to the company, but any cause for complaint on this score that did exist was removed by the later activity of those charged with the work of enforcing the laws.

A feature of the strike was that despite the many new employees and with cars operating on almost normal schedule there was only one accident. This occurred on a car operated by an old employee and was not due to carelessness or negligence on the part of the company. In fact, in the history of the company there were never so few accidents. This is considered especially remarkable because of the numerous obstacles which the company was obliged to overcome. Out of 130 employees who worked as motormen and conductors and carhouse employees, only twelve remained loyal to the company at the declaration of the strike. The company had to build a new organization practically as large as the one which it had at the inception of the strike. Despite these obstacles, the company was able to break the strike and is now being complimented upon the attention, courtesy and fine appearance of the men who compose the new personnel. The new men are all residents of Bangor or Penobscot county and have thoroughly at heart the best interests of the community, of which most of them have been a part for many years.

## REPRISAL ADVOCATED IN BUFFALO TAX CASE

In an effort to force the International Railway, Buffalo, N. Y., to drop its action for a review of its special franchise assessment made by the State Tax Commission, William S. Rann, corporation counsel of Buffalo, has recommended to the City Council that he be authorized to start a proceeding before the Public Service Commission for a reduction of fares charged by the railway on its city lines from 5 cents to 4 cents. The recommendation will be considered by the five members of the Council at its next meeting.

The special franchise assessment made by the State Tax Commission valued the company's properties and rights at \$12,557,500. This was reduced to \$8,573,850, and upon this the city levied a tax which became a lien on July 1, 1916. The company has instituted legal proceedings to have this assessment reviewed in the courts and is now seeking to have the matter sent to a referee for trial.

It will be necessary in the defense to have the company's properties appraised. The cost of the appraisal will be \$50,000, of which \$20,000 is now available. In view of the fact that the appraisal must be made, the corporation counsel says this same evidence could be used in the proceeding to have the rate of fare reduced. Their recommendation to the Council also points to the last financial statement of the company on file with the Public Service Commission which shows increased net earnings. In conclusion Corporation Counsel Rann says: "There is, I think, good reason to believe that the company could earn a net return of more than 6 per cent upon the present valuation of its property at the rate of fare of 4 cents."

## SHORT STRIKE IN QUEBEC

A number of the employees of the Quebec Railway, Light & Power Company, Quebec, Que., who had organized themselves into a union, went on strike on Aug. 30 for the purpose of obtaining an increase in wages and recognition of their union by the company. The strike was confined to the lower section of the city. The upper town and Sillery sections of the system were not affected, that part of the system being operated by non-union employees. According to H. G. Matthews, general manager of the company, the men in the company's employ were under agreement to abide by the present scale of wages until Dec. 1, 1916. The company therefore took out ten warrants for breach of contract against the moving spirits in the strike and announced that the warrants would be executed unless the men returned to work by noon. A temporary settlement was effected through the intervention of Aldermen C. J. Lockwell and E. Theriault and Louis Letourneau, who prevailed upon the company to withhold the warrants. Subsequently these parties, together with Hector Laferte, counsel for the strikers, obtained a letter from the company agreeing to have the matters in dispute submitted to arbitration under the provisions of the Lemieux Act. The men returned to work at once and by evening all cars were again running on schedule. On Sept. 6 the company chose J. L. Perron as its representative on the board of arbitration, while the employees named Hector Laferte. The two arbitrators will follow the usual custom of selecting a third arbitrator.

## BIDS FOR CONSTRUCTION MATERIAL RECEIVED

The Public Service Commission for the First District of New York during the week ended Sept. 9 received bids for the installation of tracks on the Seventh Avenue branch of the Lexington Avenue Rapid Transit Railroad. This is the line which connects with the first subway near Forty-third Street and Seventh Avenue, and forms what will ultimately be, together with the upper west side portion of the first subway, the new west side through line under the dual system. The low bidder on the contract was the firm of Engel & Hevenor, New York City, the unofficial total of whose bid was \$229,440. The contract provides for the laying of tracks from a connection with the first subway in Times Square under Seventh Avenue and other thoroughfares to a connection with the first subway again in Battery Park and also in the Brooklyn extension of the Seventh Avenue line. Practically all the materials, including ties and rails, employed in the work will be furnished to the contractor by the city. These have been purchased by the Public Service Commission for the city under separate contracts. The contract for the construction of the line was formally awarded to Engel & Hevenor by the commission on Sept. 14.

Bids have been opened by the commission for the supply of special work, including frogs and switches and necessary appurtenances to be used in the construction of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway. All of the work is to be delivered within four months. The Ramapo Iron Works, New York City, was the low bidder at \$11,427.

The commission on Sept. 28 will receive bids for the construction of a railroad yard in connection with the White Plains Road extension of the first subway. The yard will be located one block east of White Plains Road and will cover an area of several city blocks. Entrance to the subway yard will be from the north, and to the elevated yard from the south. The whole space to be occupied by both yards is about 800 ft. x 1100 ft. There will be storage room for nearly 600 cars in the subway yard, and for about 300 cars in the elevated yard.

The commission has granted an application of the New York Municipal Railway Corporation for an extension of time of two years to July 27, 1918, to complete the construction and begin the operation of the additional tracks on Fulton Street, Brooklyn, and an extension of two years to Feb. 2, 1918, to complete the construction and begin the operation of additional tracks on the Broadway line in the same borough. One cause for the extension of time has been the decision to rebuild the elevated structure at East New York, the contract for which was approved last



January and will require approximately two years to complete. Discussion over the disposition of the tracks on Fulton Street, west of Cumberland Street, is also an important factor in the grant of the extension of time in respect of that line.

### INJUNCTION SOUGHT TO PREVENT COERCION IN ATLANTA STRIKE

On Sept. 7 Judge John T. Pendleton at Atlanta, Ga., signed a temporary restraining order directed against the officers and some thirty or forty individual members of the union linemen of the Georgia Railway & Power Company, who are on strike, and directed them to appear in court on Sept. 16 and show cause why a permanent injunction should not be issued. In its petition the company asks for a permanent restraint of the defendants from attempting to coerce men willing to enter the employ of the company; from molesting them personally, or harassing them; from picketing the company's premises, or loitering near those premises; from violence, threats of violence, insults, indecent talk, abusive epithets, and other attempts at coercion of men already in the company's employ, with intent to make them break their contracts with the company, or of men willing to take jobs, to keep them from taking those jobs.

The company alleges that the majority of the men employed in the line department who were members of the union and went on strike, did not want to strike, and were contented with their work, and quit their jobs only on order of their union officers.

The history of the strike is set out in the petition, which shows that on Aug. 5 the company discharged, "in the proper conduct of its business, for good and sufficient reasons," J. L. Carver, E. P. Smith and another man named Castleberry; that on Aug. 11 it received a demand from the local union, presented by Purcell, Pollard, Carver and others, that the men discharged be reinstated, this demand being accompanied by the threat of strike; that on Aug. 12, "against the desire of the majority," sixty-five men in the line department quit in a body. Altogether, according to P. S. Arkwright, president of the company, less than 100 men have quit the employ of the company since the strike began. The places of the strikers have been filled. The company is unwilling to take the strikers back in a body.

### INCREASE IN WAGES FOR LOUISVILLE MEN

Two weeks after a delegation of motormen and conductors employed by the Louisville (Ky.) Railway and the Louisville & Interurban Company waited on President T. J. Minary, favorable action on their request for an advance in wages was taken by the board of directors. This advance, 1 cent an hour all around, is given in the expectation that the trainmen will continue to co-operate with the company in the safety-first work, and to meet the advance, estimated to total \$40,000 annually, that amount has been set aside out of the accident fund. The scale heretofore has ranged from 21 cents to 24 cents on all city lines, although on the country lines the 25-cent men are advanced to 26 cents an hour. The employees affected number about 1000 men. In announcing the advance in wages Samuel Riddle, superintendent of transportation, issued a statement to the men, reading in part as follows:

"Our board of directors, on carefully considering an increase of wages, has been confronted with a large falling off in receipts during the past three years and finds that an increase can be made possible only by an increase of receipts and a further reduction in accidents. The accident campaign, by reason of the faithful co-operation of motormen and conductors, proved successful and the management believes that by greater effort and concerted action on the part of motormen and conductors better service can be rendered which will better please the public and result in increased travel, and also in a further reduction in accidents. With this expectation in view it has been decided to set aside \$40,000 out of the accident fund to be paid as a premium, beginning Sept. 16, 1916, at the rate of 1 cent an hour to motormen and conductors in the service as of Sept. 15, 1916."

**Increase in Wages in Beaumont.**—Notices have been posted announcing an increase of 2 cents an hour in the pay of conductors and motormen employed by the Beaumont (Tex.) Traction Company and the Jefferson County Traction Company. The increase went into effect on Aug. 15.

**Reduction in Taxes Asked.**—The Northern Texas Electric Company, Fort Worth, Tex., has applied to the city for reduction of taxes. The application states that jitney competition lowered gross in 1915 by \$250,000 and that so far in 1916 loss has been \$150,000. The claim for reduced taxes is based on the depreciated value of the franchise because of jitney competition.

**Buffalo City Men to Operate Interurban Cars.**—Under the terms of an agreement reached between Nathan A. Bundy, as receiver for the Buffalo (N. Y.) Southern Railway, and its platform men, motormen and conductors of the International Railway will operate cars from the Buffalo city line to the Main Street terminal. Heretofore the interurban men operated cars over the Buffalo tracks.

**Contract for Subway Approaches to Cleveland Bridge Awarded.**—The board of County Commissioners on Sept. 9 awarded the contract for building the subway approaches to the new Superior-Detroit Avenue bridge across the Cuyahoga River to the Bates & Rogers Construction Company, Chicago, Ill., for \$624,992. The estimate of the cost of the work furnished by W. A. Stinchcomb, county engineer, was \$672,000.

**Trenton Working Agreement Signed.**—The working agreement between the Trenton & Mercer County Traction Corporation, Trenton, N. J., and its employees, has finally been signed. The agreement is in the same form in which it was decided upon several weeks ago. The men for a time refused to sign it, wanting an additional clause inserted providing certain pay for extra men. The clause was finally left off.

**Fenders to be Required in Helena.**—Mayor R. R. Purcell of Helena, Mont., says that steps will be taken at once by the city officials to compel the Helena Light & Railway Company to install satisfactory fenders on all cars operated in Helena. This statement comes as the result of the death of Elmer Hoepfner, killed by a car at the corner of Main and Grand Streets. The coroner's jury placed the blame for the accident on the railway.

**Baltimore Bridge Franchise Value Fixed.**—On Sept. 5, the city of Baltimore, Md., voluntarily fixed the price of the franchise to the United Railways & Electric Company on the New Hanover Street Bridge at \$107,943. Between that figure and the original estimate by the city of the value of the grant there is a difference of more than \$500,000. More than half of the \$107,000 can be paid in five annual installments, if the United Railways & Electric Company so elects.

**Northern States Preferred Stock Sales.**—During the month of August \$56,800 of 7 per cent preferred stock of the Northern States Power Company was sold to 144 of the company's customers in home territory. Total sales since the stock was first offered to the company's patrons amount to \$801,400 held by 1475 customer-stockholders. The conditions under which this stock is sold to customers were described at length in the ELECTRIC RAILWAY JOURNAL of Aug. 12, page 264.

**Birmingham Wage Negotiations Begun.**—J. S. Pevear, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., is quoted as follows in regard to the negotiations covering terms of service for the employees: "There is nothing of interest to the public in what we are doing now. The organization has been recognized by the company, and only the terms of the contract are left to be worked out between the company and the men. The matter will be left to arbitration in the event that we cannot agree."

**Lincoln Street Railway May Cease Operations.**—In the Lincoln Street Railway cases the Public Utilities Commission of Illinois granted authority to a utility to discontinue completely its street railway operations in the city of Lincoln. The company made a showing for discontinuing an



established utility service, based upon continued annual operating losses. The commission held that the company, with the permission of the city of Lincoln, should not be compelled to continue the further operation of its street railway business.

**Laurel Line Increases Wages.**—Yardmen, conductors and motormen employed by the Lackawanna & Wyoming Valley Railway, a third-rail electric system operating between Wilkes-Barre and Scranton, Pa., were granted an increase in wages on Aug. 30, following a conference of railway officials and a committee of the employees. The new scale of wages became effective on Sept. 1. It provides, for motormen and conductors on electric locomotives, wages of 40 cents an hour, an increase of 1½ cents; trainmen on local and express service, 35½ cents, an increase of 2 cents; brakemen, 27½ cents an hour, an increase of 1 cent, and switchmen, an increase of 1 cent an hour.

**Some Cleveland Questions up for Settlement.**—Fielder Sanders, street railway commissioner of Cleveland, has submitted to the City Council a plan for relieving congestion at Euclid Avenue and East Ninth Street. He proposes so to reroute cars that no cars will be allowed to turn at right angles at that corner. During the rush hours vehicles are to be held to the same rule. The Council has asked the Cleveland Railway to report on the desirability of purchasing the track to the North Randall race tracks. The street railway committee has indorsed legislation providing for inclosed steps leading from the Payne Avenue terminal to the 105th Street crosstown line. Accident suits aggregating \$225,000 in damages were filed against the company during the week ended Sept. 2. Seven of the suits were filed by one firm of lawyers. One for \$50,000 was brought by the father of a sixteen-year-old girl who was struck by a car some time ago.

**Buffalo Southern Railway Strike Off.**—After a series of conferences between a committee of bondholders of the Buffalo (N. Y.) Southern Railway and its employees, which culminated in an agreement on Aug. 31, the strike of platform and trackmen, which has been in effect since last May, has been called off. There will be no increase in wages for the platform men and the same conditions will continue as prevailed before the strike. Platform men are restored to the number required to operate the cars with their former seniority rank and all prosecutions resulting from the strike will be dropped. The men will receive 25 cents an hour for the present and whether or not an increase will be granted later will depend upon the result of arbitration conferences. Trackmen will receive an increase of 3 cents an hour and it is agreed that ten hours shall constitute a day's work and any employment shall be considered as a day. Partial service was restored between the Buffalo city line and Ebenezer, Orchard Park, Armour and Hamburg on Sept. 3, but owing to the damage done by strikers and their sympathizers it will be some time before there is complete restoration of service.

## PROGRAMS OF ASSOCIATION MEETINGS

### New England Street Railway Club

The outing of the New England Street Railway Club, which is to be held in Springfield and Holyoke on Sept. 21-22, will be attended by the entire membership of the club if the Springfield Street Railway, the Holyoke Street Railway and the other important business interests in those cities have anything to say about it. On Sept. 12, the Springfield Board of Trade, through its convention bureau, sent out a special letter to all members of the club extending a cordial invitation to visit the city and see its many attractions and saying that no pains will be spared to make this outing one long to be remembered. The Holyoke Board of Trade is also showing great interest in the outing and is sending out a letter pointing out the places of interest, industries, etc., in that city and offering to assist in making the visit of the club to that city a memorable one. Finally, lest the members will overlook the eventful date, a series of reminder cards has also been sent out by "Bemis," which is short for the Bemis Car Truck Company. The last of these reminders reads: "If broke, come anyhow."

## Financial and Corporate

### ANNUAL REPORT

#### Brazilian Traction, Light & Power Company, Ltd.

The income statement of the Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., in Canadian currency for the year ended Dec. 31, 1915, follows:

Revenue from securities owned and under contracts with subsidiary companies .....	\$5,339,192
Interest on advances to subsidiary companies .....	273,683
	\$5,612,876
General and legal expenses, administration charges and interest on loans .....	218,074
Surplus available for dividends .....	\$5,394,802
Dividends .....	4,849,380
Surplus carried forward to profit and loss .....	\$545,422

While the combined earnings of the companies in Brazilian currency fully realized the expectation of the board, being considerably greater than those of the previous years, the result was not so satisfactory when such earnings were converted into Canadian currency. For some years prior to the outbreak of the European war, the value of the milreis for sight bills on London was approximately 16d. During the latter part of 1914, however, the average value fell to approximately 13d., and in 1915 showed a further depreciation to an average of approximately 12.5d. Converting the earnings during 1915 at the average rates prevailing prior to the war, the net revenue in Canadian currency would be increased by more than \$3,000,000.

During the first half of 1915, dividends on the ordinary shares at the rate of 1½ per cent each were paid on March 1 and June 1 respectively. As, contrary to expectations entertained earlier in the year, the exchange value of the milreis continued to fall, the board decided to limit the dividends payable on Sept. 1 and Dec. 1 to one-half of 1 per cent each, making a total dividend of 4 per cent for the year.

Although rigid economies were effected, the cost of operation and maintenance was adversely influenced by the rise in the price of materials, and by the enormous advance in ocean freights. This advance particularly affected the earnings of the gas business, as owing to the requisition by the British government of some of the steamers employed in the company's service for carrying coal, it became necessary to charter other steamers at rates greatly exceeding those which would have been payable under normal conditions. With a return to normal conditions the revenue of the company should be not only equal to that obtained prior to the war, but should show a considerable and steady increase. Conditions generally in Brazil are showing distinct signs of improvement. All the coffee purchased for exchange purposes during 1914 and at the beginning of 1915 was disposed of, and at prices which realized a sum in excess of that which it is estimated would have been received had the usual method of making remittances been followed.

The operations of the Rio de Janeiro Tramway, Light & Power Company, Ltd., for the year resulted in substantial increases in earnings in all departments except the tramways. The earnings of this department showed a slight decrease. The loss came from the first three months of the year, after which the receipts compared favorably with those in 1914. The passengers carried during the year totaled 191,556,302 as compared to 192,103,635 in 1914, while the car-miles were 24,409,259 and 24,815,078 respectively. During the year the company built and put into operation eleven cars and progress was made on thirty trailers.

The tramways department of the Sao Paulo Tramway, Light & Power Company, Ltd., also showed slightly decreased earnings for 1915, but the present outlook is good, inasmuch as the earnings for the first three months of 1916 exceeded those for the corresponding period of last year. The passenger traffic in 1915 fell off from 53,732,292 to 51,574,145, while the car miles decreased from 9,496,091 to 9,425,231. This branch did little new construction during the year.



## FUTURE OF MEXICO TRAMWAY

## Bondholders at Meeting in October Will Consider Policy to Be Pursued Pending Improved Mexican Conditions

The bondholders of the Mexico (Mex.) Tramways and all its affiliated companies have been addressed by the National Trust Company, Ltd., Toronto, Ont., the trustee of each of the trust deeds securing the several issues of bonds, in regard to a meeting of the security holders to be held in London, England, on Oct. 4, at which meeting important general questions of policy relating to the future conduct of the companies' business, pending an improvement of conditions in Mexico, will be laid before the bondholders for their approval. The trust company refers to the default in the payment of bond interest on account of the extraordinary conditions which prevailed in Mexico and says that of a total of £12,330,371 of bonds outstanding more than £7,553,066 have been deposited with the committee. The company says that it would have been of little use to convene bondholders' meetings until a policy based upon first-hand information as to the conditions in Mexico could be recommended. It then refers to the study of the properties made by F. H. Phippen and E. D. Trowbridge, referred to at length in the *ELECTRIC RAILWAY JOURNAL* of July 15, 1916, page 118. Mr. Phippen will attend the meeting to amplify his report and answer inquiries. The resolutions intended to be placed before the formal meeting for the approval of the bondholders are as follows:

1. Approving the policy heretofore adopted and the policy recommended for the future as explained by circular letter dated June 27, 1916, issued by the trustee and by the bondholders' committee constituted by agreement dated Feb. 18, 1916.
2. Appointing a committee to represent and act for the holders of all the said bonds and with such constitution and powers as to the meeting may seem advisable.
3. Authorizing and directing the trustee to waive defaults committed or to be committed by the company in payment of interest and sinking fund on the bonds and otherwise on such conditions and for such periods as the meeting may think fit.
4. Determining what steps shall be taken for the protection of the bondholders' interests and to obtain for the bondholders control of the future conduct of the affairs of the company.
5. Authorizing, subject to such conditions and limitations as may be approved by the meeting, the creation and issue of prior lien bonds ranking in priority to the said bonds upon all or any of the assets of the company.
6. Authorizing the trustee to vote or to permit the company to vote at meeting of the bondholders of the Mexican Light & Power Company, Ltd., any bonds of that company held as part of the mortgaged property in favor of resolution similar to those herein referred to.
7. Precluding any bondholder from taking any proceedings against the company on his bonds or the coupons, or for the enforcement of the security therefor without the approval of the said committee.
8. Determining upon what conditions the management and control of the company's assets shall be permitted to remain vested in the board of directors and authorizing the trustee to permit the company to hold and manage, and to exercise voting and other rights in respect of, the mortgaged properties and to receive the income thereof.
9. Authorizing the trustee to concur with the company in executing and doing such supplemental trust deeds, documents and things as it may consider necessary to give effect to any resolutions passed at the meeting, and for the protection of the trustee in carrying the said resolutions, trust deeds and documents into effect, and authorizing the trustee to act upon or in accordance with any direction or resolution of the committee.
10. Generally any other resolutions which the meeting may consider desirable for the protection of the bondholders or for giving effect to the recommendation of the trustee or the bondholders' committee at such meeting.
11. Agreeing to the modification of the rights of the bondholders against the company and its property to the extent necessary to give effect to any such resolutions, supplemental trust deeds and documents.

## REORGANIZATION OF ALBIA PROPERTIES

The protective committee representing the holders of the bonds of the Albia (Iowa) Interurban Railway, of which Guy Morrison Walker is chairman, has arranged to organize a new light and railway company to succeed the Albia Interurban Railway, the property of which was sold under foreclosure some time ago. The new company is to be known as the Albia Light & Railways Company. It will take over the property disposed of at foreclosure, paying the committee therefor new first mortgage 5 per cent gold bonds equal to 70 per cent of the par value of the present outstanding bonds of the Albia Interurban Railway and 6 per cent preferred stock in an amount equal to 30 per cent of the par value of the outstanding bonds. In addition, the organizers of the new company agree to secure all the outstanding bonds of the Albia Gas Company and to exchange them for bonds of the same issue as those given to the bondholders so that the new bonds will be a first mortgage on all the property. It further has agreed to pay all the expenses of the committee and raise the necessary cash to pay off the preferred claims, the receivers' fees, etc., so that the committee will be able to distribute the new bonds and the new preferred stock without any deduction for expenses of any kind.

Under the plan, bondholders receive par in new securities for par of old Albia Interurban Railway bonds, 70 per cent thereof in new first mortgage 5 per cent bonds and 30 per cent thereof in new 6 per cent preferred stock. The new bonds will be in the denomination of \$1,000 and \$100. Fractions of bonds less than \$100 and fractional shares of stock will be covered by the issue of script, which will be exchangeable in amounts of \$100 or multiples thereof for bonds and shares of preferred stock. The reorganized company will have authorized and outstanding \$400,000 of common stock of a par value of \$100 and \$100,000 of 6 per cent non-cumulative preferred stock of a par value of \$10. The new bonds are dated July 1, 1916. The total authorized amount is \$500,000, of which \$250,000 are outstanding. Interest is payable January and July at the office of the Empire Trust Company, New York, N. Y. The bonds are due in 1941. There is no sinking fund provided and the bonds are non-callable. The \$250,000 of bonds at present unsold are reserved for extensions and additions. During the period that the property was operated by the receivers, the net profits were spent in improvements to the property by order of the court.

The officers of the Albia Light & Railways Company, the successor company, are: Albert L. Fowle, president; Merle R. Walker, vice-president; A. S. Leyland, secretary; Ralph W. Bayer, treasurer.

## ELECTRIC RAILWAY VALUES DEPRECIATE

The Washington State Tax Commission, in compiling the regular June schedule for 1916, estimates the depreciation in valuation of the electric railways in Washington on account of automobile competition since the 1915 schedule was compiled, at \$2,747,180. This will reduce taxation receipts from such lines \$48,075. The reports for the year ending Dec. 31, 1915, show decreases in gross and net receipts in both freight and passenger earnings of almost every electric line in the State. This reduction in receipts has prevented enlargements and extensions, and the decrease in valuation is figured on account of depreciation and obsolescence of equipment, formerly overcome by replacement and improvement.

On this subject *The Electrogram* of the Puget Sound Traction, Light & Power Company, Seattle, Wash., said in a recent issue:

"The decreased valuation and consequent loss of taxes from electric railways is of course primarily a loss to the stockholders of the companies, but it is also a loss to all other taxpayers, who must make up the deficit in public revenues, and to patrons of the street railways who will suffer in loss of service as the companies are forced to retrench, owing to losses caused chiefly by unregulated auto competition. The situation is serious enough to cause every thoughtful citizen to consider whether it would not be the best policy to regulate auto transportation just as strictly as electric railways are regulated."



**American Railways, Philadelphia, Pa.**—Newburger, Henderson & Loeb, Philadelphia, Pa., bankers, have made public a statement in connection with the acquisition of the Electric Company of New Jersey, the Pennsgrove Electric Light & Power Company, the Clementown Township Electric Improvement Company, the Williamstown Electric Company and the Woodstown Ice & Storage Company by the American Railways, referred to originally in the *ELECTRIC RAILWAY JOURNAL* of June 10 and Aug. 12 in connection with the application of the American Railways to the Board of Public Utility Commissioners of New Jersey, for permission to consummate the purchase. The purchase of these properties dates from Sept. 1. They are taken over through the subsidiary of the American Railways known as the Electric Company of New Jersey. The district served covers territory on a line south of the West Jersey & Seashore Railway and embraces a population of 85,000. Part of the power used will be generated as at present at the power plant at Bridgetown, N. J., owned by the American Railways, and additional current will be supplied directly from Wilmington through a duplicate power system running under the Delaware River and thence by transmission lines to Paulsboro, Salem and other places. The taking over of these properties brings under the single ownership of the American Railways, without competition, the entire electric light and power business of the valley of the Delaware on both sides of the river for a distance of 100 miles.

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.**—Justice Wesley Dudley in the Supreme Court has authorized George Bullock as receiver of the Buffalo & Lake Erie Traction Company, operating between Buffalo, N. Y., and Erie, Pa., to issue \$140,000 of receiver's certificates, \$135,000 of which will be used to retire securities to this amount, and the balance to improve the company's property.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—The National City Company, New York, N. Y., and Halsey, Stuart & Company, Chicago, Ill., are offering for subscription \$3,620,000 of first mortgage 5 per cent gold bonds of the Chicago, North Shore & Milwaukee Railroad, the successor to the Chicago & Milwaukee Electric Railroad, dated July 1, 1916, and due on July 1, 1936. The total authorized issue of the bonds is \$10,000,000. They are callable as a whole or in part on any interest date at 105 and interest. The bonds are in coupon form, registerable as to principal, in interchangeable denominations of \$1,000, \$500 and \$100. The Continental & Commercial Trust & Savings Bank, Chicago, Ill., is the corporate trustee.

**Kanawha Traction & Electric Company, Parkersburg, W. Va.**—The Kanawha Traction & Electric Company has applied to the Ohio Public Utilities Commission for authority to issue \$2,000,000 of bonds. As noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26, page 375, the attorneys for the company recently filed a mortgage dated Aug. 1 with the court at Parkersburg to the Fidelity Trust Company and Van Lear & Black as trustees to secure an issue of \$5,000,000 of bonds to be put out in serial issues of such amounts as the needs of the company require. It was then stated that series A of these bonds would be issued in an amount sufficient to refund \$1,500,000 of two-year 5 per cent notes of the Kanawha Traction & Electric Company due on June 15, 1917, and \$150,000 of bonds of the Marietta Traction Company which mature early in 1917.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—E. W. Moore, vice-president of the Northern Ohio Traction & Light Company, has announced that 80 per cent of the stock required to bind the sale of the property to Eastern financial interests has been deposited. The agreement provides that 95 per cent of the stock shall be deposited. The meeting of stockholders scheduled for Sept. 12 in Akron was postponed.

**Portland Railway, Light & Power Company, Portland, Ore.**—The Portland Railway, Light & Power Company has retired the \$87,000 of 6 per cent bonds of the City & Suburban Railway which remained outstanding of the original issue of \$1,000,000. The bonds were dated Sept. 1, 1891, and were due Sept. 1, 1916. Their retirement was provided for under the terms of the indenture securing the first and refunding 5 per cent bonds of the Portland Railway, Light & Power Company.

**Youngstown & Southern Railway, Youngstown, Ohio.**—The property of the Youngstown & Southern Railway was sold at public auction on Sept. 7 to W. J. Blackburn of Youngstown, who represented the bondholders. The price was \$650,000, two-thirds of the appraised value. On the following day application was made to the Ohio Public Utilities Commission for authority to sell the property to the Youngstown & Suburban Railway for \$1,550,000, a reorganization of the old company. The Interurban Realty Company, a subsidiary of the new corporation, has been organized to take title to about 1000 acres of coal land owned by the Youngstown & Southern Railway at West Point.

#### DIVIDENDS DECLARED

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, 1½ per cent, preferred.  
 Eastern Power & Light Corporation, New York, N. Y., quarterly, 1¾ per cent, preferred.  
 Galveston-Houston Electric Company, Galveston, Texas, 3 per cent, preferred.  
 Interborough Consolidated Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.  
 Interborough Rapid Transit Company, New York, N. Y., quarterly, 5 per cent.  
 Kansas City (Mo.) Railways, 2½ per cent, preferred.  
 Manhattan Railway, New York, N. Y., quarterly, 1¾ per cent.  
 Philadelphia (Pa.) Traction Company, \$2.  
 Springfield Railway & Light Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.  
 United Light & Railways, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; 1 per cent, common.  
 West End Street Railway, Boston, Mass., \$1.75, common.  
 West India Electric Company, Kingston, Jamaica, quarterly, 1¾ per cent.

#### ELECTRIC RAILWAY MONTHLY EARNINGS

##### BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '16	\$97,834	\$76,352	\$21,482	\$27,831	\$116,178
1 " " '15	91,243	62,182	29,061	17,021	112,159

##### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.

1m., July, '16	\$50,976	\$24,655	\$26,321	\$11,468	\$14,853
1 " " '15	46,154	22,690	23,464	11,086	12,378
7 " " '16	261,592	146,717	114,875	79,630	35,245
7 " " '15	236,091	134,785	101,306	76,811	24,495

##### CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., July, '16	\$932,505	\$587,455	\$345,050	\$98,634	\$270,260
1 " " '15	806,482	474,990	331,492	98,265	126,649

##### HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., June, '16	\$476,959	\$210,273	\$266,686	\$217,661	\$49,025
1 " " '15	444,458	193,753	250,705	213,061	37,644

##### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., June, '16	\$139,003	\$86,288	\$52,715	\$36,237	\$16,478
1 " " '15	119,734	78,188	41,595	36,349	5,246
6 " " '16	722,320	483,885	238,435	217,813	20,622
6 " " '15	625,123	434,619	190,505	216,276	125,771

##### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., July, '16	\$164,595	\$90,293	\$74,302	\$36,704	\$37,598
1 " " '15	136,446	78,781	57,665	36,221	21,444
7 " " '16	886,916	574,179	312,737	254,517	58,220
7 " " '15	761,570	513,400	248,170	252,496	14,326

##### NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., July, '16	\$44,930	\$30,663	\$14,267	\$7,987	\$6,325
1 " " '15	49,783	30,801	18,982	8,000	11,053

##### NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., July, '16	\$50,044	\$44,504	\$5,540	\$6,015	\$591
1 " " '15	42,611	43,287	676	\$8,345	\$6,676

##### RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., July, '16	\$569,275	\$371,502	\$197,773	\$120,688	\$78,599
1 " " '15	472,148	319,416	152,732	120,284	33,748

##### WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., July, '16	\$23,125	\$22,400	\$725	\$1,815	\$1,064
1 " " '15	26,016	22,719	3,297	1,590	1,737

\*Includes taxes. †Deficit. ‡Includes non-operating income.

§Excludes interest on bonds, charged income and paid by the N. Y., N. H. & H. R. R. under guarantee, also interest on notes held by the N. Y., N. H. & H. R. R. not credited to income of that company.



## Traffic and Transportation

### BOSTON SERVICE INVESTIGATION COMPLETED

Massachusetts Public Service Commission Concludes Extended Study of Service—Present Methods Approved

An extended study of the service of the Boston Elevated Railway in the Jamaica Plain district has been completed by the Massachusetts Public Service Commission, resulting from a petition of Representative Alfred J. Moore and others for restoration of crosstown surface line facilities from Forest Hills to Park Street via Hyde Square. As the result of various changes residents of Jamaica Plain have been deprived of all through service to Forest Hills and have been obliged to make two transfers, one at the Jamaica Plain carhouse and another three minutes later at the Forest Hills elevated terminal station, in order to reach points in the Roslindale, Germantown, Mount Hope and Mattapan districts of Boston, as well as points beyond in Dedham, Hyde Park and Milton. The inconvenience of this arrangement, with respect to transfers at the Jamaica Plain carhouse, will shortly be minimized by improvements at this point. The company is installing additional tracks and loops with suitable facilities for the lay-off of cars and is also constructing a prepayment area which will permit of a bodily transfer being made under shelter instead of in the street.

From all the evidence available, the commission believes that the present method of routing cars from the Hyde Square district is consistent with sound principles of street railway operation and is not at variance with any reasonable standard of public convenience in that district. Most of the travel from the district is on the Dudley Street line, which, in conjunction with the elevated lines from the Dudley Street station, affords the quickest service to the business center of Boston; the Tremont Street line furnishes service without change, and by the most direct route, to all stations in the Tremont Street subway; and for those passengers, relatively few in number, who desire to reach points in the Back Bay district, free transfers are given at Roxbury Crossing and at the intersection of Tremont and Northampton Streets. The commission finds that the number of passengers from the Hyde Square district now making such a transfer is too small to justify an additional through line, and that the inconvenience of the present transfer arrangements is no greater for the people of the Hyde Square district than for the much larger number of persons from Brookline, Cambridge and other suburban communities who must also transfer to reach Huntington Avenue and other surface points in the Back Bay district. The commission says that any attempt to establish through service for every small group of riders on every available route in the Boston Elevated system would result in gross waste of the revenues contributed by the riding public and would be utterly impracticable from an operating standpoint.

Improvements in Jamaica Plain service are now under way. To relieve the congestion of travel during rush hours on the South Huntington Avenue and Dudley Street lines the company has agreed to operate a trailer service in rush hours on both these lines. This service is now in partial operation and is to be increased. An important improvement has also been effected by a rearrangement of stops on Center Street, Jamaica Plain, in the heart of the factory district, so as to permit the simultaneous loading of three single cars or two two-car trains, instead of only one car at a time, as previously. The company has assigned additional men to superintend the loading of these cars at this point, and the inspection department of the commission has been advised by leading factory officials that these arrangements have proved satisfactory to their employees and have also resulted in expediting the entire service over Center Street in Jamaica Plain (the principal artery of travel) during rush hours. In addition to these changes the commission is of the opinion that free transfer privileges should be established at Jackson Square.

### TEXT OF PENNSYLVANIA JITNEY DECISION

Commission Holds Jitney to Be a Public Service Company and Requires Certificate of Public Convenience

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of Sept. 9, page 461, of the decision of the Public Service Commission of Pennsylvania holding any one operating a "jitney bus" over a fixed route and regularly soliciting the carriage of passengers for hire to be a public service company within the meaning of the Public Service Company Law and requiring such operator to secure a certificate of public convenience from the commission. The report and order of the commission follow:

"The complaint in this case sets forth that the respondent who is a resident of the borough of Tarentum, Allegheny County, 'is now and has been for some time past engaged in the business of a common carrier of passengers between the village of Natrona and the boroughs of New Kensington, Arnold and Parnassus, Westmoreland County, Pa., and between the boroughs of New Kensington, Arnold and Parnassus and the borough of Aspinwall, Allegheny County, Pa., and that as such common carrier he is the owner and operates a motor-driven vehicle or automobile having State license No. 41,288, commonly known and referred to as a "jitney bus," and solicits and transports passengers between the said and intervening points for hire.'

"In the answer of the respondent submitted under oath these averments are admitted, excepting that it is alleged that he does not travel upon, over and adjacent to the street car tracks of the complainant the full length of the route traversed by him, but travels over only a portion of said route, being the route between Natrona, Brackenridge and through East Deer Township where there is only one public highway used in common by complainant and the general public. For further defense the respondent answers that he is not a common carrier of passengers nor a public service company within the meaning of the act of July 26, 1913, and that he is not subject to the provisions of said act; that if he is a common carrier the act of July 26, 1913, does not apply to him and if it does so apply it is unconstitutional in failing to give notice of said matter in its title.

"At the hearing had upon this complaint the respondent was called and testified that he usually operated between Tarentum and Natrona and Natrona to New Kensington, going usually up Fourth Avenue to Allegheny and from Allegheny to Third Avenue. The automobile employed by him for the service which he was rendering was a five or six-passenger E. M. F. car. Although the affidavit alleged that an application had been presented by respondent to this commission for a certificate of public convenience, the records of the commission negatives the statement.

"Under all the evidence the case comes squarely within the rulings of this commission. In *Scranton Railway vs. Walsh* (P. U. R. 1916, D. 18), and for the reasons therein stated complaint must be sustained. The complainant is engaged in the business of a common carrier of passengers; for this service he has not applied for nor received from the Public Service Commission a certificate of public convenience authorizing him so to do. An order will, therefore, be issued directing the respondent, W. T. Alter, his servants, agents and employees, to cease and desist from carrying on the aforesaid public service business until he shall have obtained from this commission a certificate of public convenience in approval thereof under and in accordance with the provisions of the public service company law approved July 26, 1913.

"This matter being before the Public Service Commission of the Commonwealth of Pennsylvania upon complaint and answer on file, and having been duly heard and submitted by the parties and full investigation of the matters and things involved having been had, and the commission having on the date hereof made and filed of record a report containing its finding of fact and conclusions thereon, which said report is hereby approved and made a part hereof:

"Now, to-wit, Aug. 25, 1916, the respondent W. T. Alter, his agents, servants and employees, are ordered to cease and desist from carrying on the public service mentioned in the above report until they shall have obtained from this commission a certificate of public convenience in approval thereof under and in accordance with the provisions of public service company law."



### BAY STATE STREET RAILWAY FILES NEW FARE SCHEDULE

Following the recent decision of the Massachusetts Public Service Commission relative to proposed fare increases on the Bay State Street Railway, the company has filed a new schedule with the commission covering all the routes on the system outside the fifteen urban groups of lines exempted by the board from higher fares at the present time. The new schedule establishes a 6-cent fare unit in place of the previous 5-cent rate on about 370 routes, the number of proposed increases on the various divisions being as follows: Lowell, sixty-four; Lawrence, forty-six; Haverhill, forty-five; Reading, Woburn and Gloucester, about ten; Lynn, six; Salem, nineteen; Chelsea, three; Fall River, eighteen; Taunton, seventy-two; Brockton, fifty-two; Quincy, thirty; Hyde Park, five. School tickets are to be sold at one-half the regular rates in all divisions. Nearly 300 of the above proposed increases apply to through routes.

Examples of the proposed increases as affecting longer-distance travel on the system follow:

Route—North of Boston	Fare Schedule in Cents	
	Present	Proposed
Merrimack Square, Lowell, and Winthrop Square, Medford	25	29
Merrimack Square, Lowell, and Woburn Square, Woburn	20	23
Merrimack Square, Lowell, and Malden Square, Malden	25	28
Merrimack Square, Lowell, and Haverhill Transfer Station	25	26
Merrimack Square, Lowell, and Massachusetts-New Hampshire State line	10	11
Lawrence Transfer Station and Malden Square	25	28
Lawrence Transfer Station and Reading Square	15	17
Lawrence Transfer Station and Wakefield Square	20	23
Reading Square and Malden Square	10	11
Lawrence Transfer Station and Salem	25	28
Haverhill and Newburyport	20	23
Boston to Marblehead (Scollay Square to Fort Sewall)	15	16

Route—South of Boston	Fare Schedule in Cents	
	Present	Proposed
Fall River and Taunton	25	28
Brockton and Lund's Corner, New Bedford	45	53
Bridgewater Center and Lund's Corner, New Bedford	35	42
Bridgewater Center and East Providence	30	35
Brockton and Nantasket Beach Steamer Landing	30	35
Campello (Brockton) and Mattapan Square, Boston	20	23
Neponset (Boston) and Nantasket Beach Steamer Landing	20	23
Quincy Square and Center Street, Brockton	20	22

No change in through or local fare limits and no change in transfer limits or reduced rate tickets (except school tickets) is contemplated in the new schedule, which is planned to take effect on Oct. 9, 1916. No formal hearings will be required by the commission, and it is expected that the above rates will receive early approval in the light of the finding in the case dated Aug. 31.

### INTERNATIONAL RAILWAY ADVERTISES NIAGARA

Large display advertisements are being used in the daily newspapers of Buffalo and throughout western New York by the International Railway, Buffalo, N. Y., announcing the completion and successful operation of the Western Electric-Davis flood-lighting system on the American cataract and rapids at Niagara Falls, N. Y., and the operation of the new Spanish aerial tramway over the Whirlpool in the lower river rapids. These two new attractions at the Cataract City have greatly increased travel over the Buffalo & Niagara Falls division of the International Railway and over the Upper Bridge and Park and River divisions along the Canadian gorge. Cars are now being operated from Buffalo on a fifteen-minute schedule throughout the day and in the early evening traffic has been so heavy a seven-and-a-half-minute schedule has been put into effect. Cars are operated every few minutes over the Park and River division between the Canadian end of the Upper Bridge and the Whirlpool where the Spanish aerial tramway is located. The Niagara Gorge Railway, operating the American gorge route line along the lower river, has put into operation an especially constructed flat car upon which is mounted a powerful electric searchlight. The searchlight car precedes a number of open observation

cars through the Niagara gorge at night on a searchlight trip of the lower river rapids. This has increased travel through the gorge and over the gorge route belt line at night. No extra charge is made for the night trip.

### SERVICE TRIPLED TEMPORARILY

The San Diego & Southeastern Railway, San Diego, Cal., recently decided to make some changes in its train service to Encanto, Lemon Grove, La Mesa, El Cajon and Santee. This new service will be put in on trial for a month or two. The purpose of introducing it is to learn whether or not the people residing in these communities are willing to patronize the railroad, as against the jitneys. If the authorities controlling the jitney situation regulate the jitneys satisfactorily and the receipts from the passenger service take care of the expenses, the company expects to put on gasoline equipment consisting of motor cars and trailers and continue the new service indefinitely.

W. Clayton, vice-president and managing director of the company, in a statement which he issued, said in part:

"If the public will patronize the railroad sufficiently to enable it to meet its expenses, we will give them the best possible service in proportion to the receipts. If, on the other hand, the public is not going to patronize the railroad, then we may just as well frankly admit that the railroad cannot continue any longer in the passenger business. The receipts from the passenger service show continuous loss, and, unless we can cover this loss, we shall have to cease entirely running passenger trains over the Cuyamaca branch. All we ask at the present time is that you and the people you represent shall co-operate with the railroad in trying to solve the present situation, which is unsatisfactory to all of us."

For some time only three trains each way have been operated over this division. A general curtailment was found necessary after the storm of last winter, owing to unregulated auto stage and auto truck competition, fully as much as to the fact that great expense was incurred following the damage done by the storm. On Aug. 28 the service was tripled and nine trains each way are being operated between Thirteenth and N Streets and Santee, the present terminal of the road.

### PRESIDENT SHOUP PROTESTS JITNEY COMPETITION

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., has sent a letter to the Board of Public Utilities and to A. L. Stephens, the city attorney, protesting against the operation of jitney buses along the same streets that the street cars use in Hollywood. The letter follows:

"On behalf of the Pacific Electric Railway I desire to enter formal protest against the operation of jitney buses in competition with our Hollywood line using the same streets, for the following reasons:

"1. There are not enough nickels used for transportation in this section to support the two classes of transportation. The 5-cent fare is a very low rate for the distance between the center of Los Angeles and the center of Hollywood. The bulk of the business is carried for a long distance. The average rate per passenger per mile, the density of traffic considered, is far below the normal rate as determined by rates in other cities of like population.

"2. The Pacific Electric Railway has accepted franchises in the city of Los Angeles under certain obligations, as to reduced rates for school children, carrying certain classes of city employees free, certain obligations as to transfers, and as to a dependable and adequate service.

"It has further obligated itself to construct and maintain sections of the streets occupied on Sunset Boulevard between the central section of Los Angeles and the Hollywood district, and on other highways in that district. Since 1910 it has spent on Sunset Boulevard and in the Hollywood-Colgrove section nearly \$1,000,000 in the paving and reconstruction of lines incident to paving.

"It pays 5½ per cent of its revenues as tax to the State of California and pays also franchise taxes to the city of Los Angeles. Franchises granted this company, under the law likewise laid certain obligations upon the city, direct or implied. At the time of the granting of these franchises



there was no other form of public street transportation except street railways. Against undue competition with street railways the law made provision whereby the other company could not occupy the same street for more than five blocks in one direction, and when a company occupied the same street for five blocks or less it had to pay with the first company its proper share of the burden of investment and maintenance of the tracks jointly used.

"Competition is now being permitted without regard for what may be due a service and investment established under franchise. The jitneys have a nominal tax compared with that the electric railways have to bear. The argument is offered that this tax should be nominal because the investment is so small. The reason the investment is so small is that the public and the railways are furnishing the road-bed free to the jitneys. If this argument had any value at all, then the electric railways should be furnished free road-bed and taxes reduced on the ground that the public had assumed the main investment burden.

"I ask that you give consideration to these conditions, and am registering this protest at this time for the reason that, in my judgment, under the conditions existing this competition, if maintained, in addition to being unjust to the electric railway, will in no great time be of necessity disastrous to the street railway service as it is now being furnished."

**Accident on Ohio Road.**—One of the limited cars on the Cleveland, Southwestern & Columbus Railway, Willoughby, Ohio, left the track and turned over at Galion on Sept. 7. Eight persons were injured, but only one was seriously hurt.

**Two Killed on Michigan Line.**—Two persons were killed and fourteen were injured, two fatally, on Sept. 8 in a head-on collision between two cars on the Michigan United Railway at Rives Junction, 10 miles north of the city of Jackson.

**Springfield Jitney Cases in Status Quo.**—By a stipulation filed by all parties in the complaint of the Springfield (Ill.) Consolidated Railway against operators of jitneys in the city of Springfield, no further action will be taken by the Illinois Public Utilities Commission unless either party desires to reopen the hearings.

**Newspaper Campaign Against Jitneys.**—Under the heading "The Street Car Versus the Jitney," the San Antonio (Tex.) Traction Company is running a series of large display advertisements in the San Antonio papers in which are set forth the superiority of the street car over the jitney as a means of transportation, and other reasons why the street car should be patronized by the public in preference to the jitney.

**New Wall Map of B. R. T. Line.**—The Brooklyn (N. Y.) Rapid Transit Company has just issued a wall map, 32 in. by 40 in. in size, showing in colors the surface and rapid transit lines of the system, and in addition the foreign rapid transit lines which form a part of the rapid transit system of Greater New York. The new map shows graphically the magnitude of the territory served by the Brooklyn Rapid Transit System.

**Co-operation Toward Accident Prevention.**—Street railway operatives and automobilists in Lexington, Ky., have begun to co-operate to reduce the number of accidents on the streets of that city. The safety-first committee of the trainmen's organization waited on the garage owners and the automobile clubs and proposed that they should use special caution, especially when backing or driving out of garages onto the streets. Motormen promised to exercise care when running past such points.

**Builds a Public Playground to Aid Safety Work.**—A safety-first innovation has been made by the Illinois Traction System in St. Louis, where the company is building a public playground with the idea in view of keeping the children of a congested neighborhood off the street. It will accommodate about 100 children and is equipped with swings, sand piles, shelters and various amusement devices. The playground is located at Twelfth Street, adjoining the company's entrance right-of-way into the city of St. Louis.

**Temporary Order Against Abandonment of Line.**—A temporary restraining order was granted to the village of Woodville, Ohio, on Sept. 6, to prevent the Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio, from tearing up its tracks through the village streets. The hearing will take place on Oct. 7. Some time ago Theodore Luce, Detroit, purchased the property for \$140,000 and, because it is not paying, decided to junk it. The light plant at Bowling Green is to continue in operation, as it is yielding a profit. Farmers along the line recently appealed to the Public Utilities Commission on the ground that the company has no right to withdraw the service. The road connects Woodville, Pemberville, Scotch Ridge, Bowling Green and Totogany.

**Interurban Roads Benefited by Strike Prospects.**—Interurban railways at Louisville were thrown into prominence unusual to them during the two or three weeks that the railroad strike threatened. R. H. Wyatt, freight and passenger agent of the Louisville & Interurban Railway, stated that the steam roads' troubles benefited the electric lines. Not only were there numerous inquiries from shippers, who never had made use of the electric lines, as to what service they could expect, but numbers of shippers who had previously used the steam road service turned to the electric lines during the week before the strike was to be called. This and the shortage of cars on the steam lines were credited with a large increase in the business of the electric lines, and everything in the way of equipment of the Louisville & Interurban lines was in full use.

**Steam Railroad Reduces Service by Four Trains Daily Because of Jitneys.**—Within a month after the paving of the highway between Astoria and Seaside, some 19 miles apart on the Oregon coast near the mouth of the Columbia River, a fleet of jitney buses appeared and absorbed practically all the passenger traffic between these two points. The jitneys did not cut fares, but, on the contrary, established a charge of \$1 for the same trip that could be made by rail for 75 cents. Passengers preferred the jitneys even at the higher rate and within a short time the Spokane, Portland & Seattle Railroad, a branch of which system connects these two cities, was running trains with only two or three passengers to the car. On Aug. 27 the company discontinued the two local trains each way which had formerly been required to handle the traffic.

**Exclusive Tourist Right for International Railway.**—The International Railway, Buffalo, N. Y., which operates the Park & River division between Chippawa, Ont., on the upper Niagara River and Queenstown, Ont., at the entrance into Lake Ontario, has been granted the exclusive right to carry tourists through the power-house zone in Queen Victoria Park, Niagara Falls, Ont. Military authorities have erected high barbed-wire entanglements in the vicinity of the Canadian-Niagara Power Company's properties and all tourists, except those on cars of the International Railway, are excluded from the zone. Cars are operated through the zone under military guard. The Niagara Falls Queen Victoria Park Commissioners have refused to accede to the request of hack men and chauffeurs for permission to take tourists through the power-house zone. The section of the park cut off from tourists adjoins the Canadian horseshoe falls.

**Railway to Install Autos in Sacramento.**—The Pacific Gas & Electric Company, Sacramento, Cal., intends as soon as possible to put two automobiles in service to relieve the conditions which exist east of Twenty-eighth Street, from M to T Streets. One of the proposed routes is from Twenty-eighth and M Streets east to Sierra and California Avenues to the upper Stockton Road and thence to Twenty-eighth and P Streets. The other proposed line is from Twenty-eighth and P Streets to Guthrie Station, thence south to the T Street court and from T Street court to Twenty-eighth and T Streets. On arriving at the respective terminals the cars will return over the same routes. By installing this service the company will be in a position to take care of the increased population. It is the intention of the company to operate these machines with carmen in uniform, the driver receiving fares and issuing and receiving transfers the same as the trainmen do on the regular cars of the company.



**Market Street, Without Jitneys, a Show Place Again.**—The jitneys have been excluded from Market Street, San Francisco, Cal., during certain hours as noted recently in the *ELECTRIC RAILWAY JOURNAL*. This has had a most beneficial effect upon traffic and has resulted in the restoration of the street to its former appearance and attractiveness. In commenting on this feature the *San Francisco Call* said: "Have you noticed the change in Market Street? It looks like the Market Street of old—wide, clean, safe for those who wish to cross it, and traffic moves swiftly and without crowding. That is the ostensible result of the enforcement of the ordinance. It has returned Market Street—at least from 10 o'clock in the morning until 4 o'clock in the afternoon—to its old place in the community. Market Street used to be to San Francisco what Fifth Avenue or Broadway is to New York, or State Street to Chicago. It was the first of the 'sights' shown to the visitor on his arrival in San Francisco."

**"Anti-Pass" Law Affects Louisville Lines.**—Under provisions of the "anti-pass" law enacted by the last Kentucky Legislature, and effective on Jan. 1, 1917, the Louisville (Ky.) Railway will curtail its reduced fare privileges to teachers and school children, unless the courts interpret the law to the contrary. The law specifically exempts only pupils of public or parochial schools riding to and from school, and school inspectors. There are no school inspectors in Louisville. At present pupils of all private schools in Louisville and all school teachers receive the half-fare privilege. Charters of two of the three Louisville lines which were merged by the Louisville Railway stipulated half rates to students and teachers and the question is whether these provisions apply to the present system as a whole or whether they are nullified by the new law. The attitude of the company is that it would willingly continue to extend the half-fare rates to all students and all teachers if permitted to do so by law.

**Union Jitneys Prohibited from Making Special Trips.**—Drivers of jitney buses in San Francisco who are members of the Jitney Bus Operators' Union are prohibited from making side trips or charging more than 10 cents for transportation of passengers, according to an order recently issued by the Joint Council of Teamsters, which is the union governing body of all vehicles. This action followed a protest by the Chauffeurs' Union, which claimed that the jitney union is violating the terms of agreement in the union charter which it received. In this charter it was stipulated that jitneys were to be used as jitneys only, and should not compete with taxicabs. Practically all taxis in San Francisco are driven by union chauffeurs, receiving union wages, and it is claimed that the taxi companies threatened to reduce the wages unless jitney bus drivers were compelled to live up to the agreement made when they joined the ranks of organized labor. The judiciary committee of the Board of Supervisors is now considering a regulation which will prohibit the use of jitney buses for any purpose except hauls over specified routes and prevent them from competing with taxicabs or with other cars that are let out for rent.

**Considering Jitney Rules in Maryland.**—The Public Service Commission of Maryland and owners of jitneys recently threshed out the new rules for jitneys which the commission framed in June. The rules were devised with a view to insuring public safety. More than 300 owners of motor cars were present or represented by counsel during the discussion. Representatives of several large passenger motor lines operating between suburban points appealed to the commission for even stronger regulations which would prevent "tramp jitneys" running on no regular schedule from running in at starting points of regular lines and driving bargains to carry passengers any distance they might care to travel along the regular established routes. The commission agreed to change the rule for determining the maximum carrying capacity of passenger vehicles by providing that 16 in. of seating space be allowed for each passenger, except that this shall not apply when the number of passengers exceeds the carrying capacity of the car's chassis. It was also decided that in case of the larger buses a seat need not be provided for every person provided the capacity of the chassis was greater than the weight of the total seating capacity.

## Personal Mention

**H. B. Ross**, superintendent of the Southern Traction Company at Waco, Tex., was presented with a gold watch recently by the motormen and conductors on the local lines in appreciation of his efforts in securing an increase in wages for them.

**S. B. Irelan**, second vice-president and general manager of the Bartlesville (Okla.) Interurban Railway, has been appointed manager of the City Light & Traction Company, Sedalia, Mo., to succeed Harry D. Frueauff, whose appointment to the Montgomery Light & Water Power Company, Montgomery, Ala., was noted in the *ELECTRIC RAILWAY JOURNAL* of Sept. 9.

**James H. Murphy**, superintendent of Division 2, South, of the Bay State Street Railway, with offices in Taunton, Mass., has been appointed temporarily to the position of general superintendent of that division, which office has been held for many years by George F. Seibel. Mr. Seibel, who is supervising architect of the buildings for the company, will devote his whole time, temporarily at least, to the mechanical end, and Mr. Murphy will have entire charge of operation of Division 2, South, which includes Taunton, Fall River and Newport. Mr. Murphy has been identified with railway service in Taunton for many years. His first position was that of tow boy. Later he went into the machine shop. Twenty-eight years ago he went to work on the horse cars as a driver. He has also served as starter and dispatcher.

**Frank Hammond**, general agent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., is the editor of *The Buzzer*, published weekly in the interest of the employees of the company. Mr. Hammond was born in Greenville, S. C., on Nov. 15, 1882. His education was limited to the grammar school. At seventeen he was employed as shipping clerk with the Charleston & Western Carolina Railway, which position he resigned after two years' service to accept a place as freight clerk with the Carolina Supply Company. After about a year's service he resigned on account of ill health and lived in quietude for about a year. In 1903, while visiting friends in Birmingham, he secured a job as bookkeeper with the Standard Oil Company, where he remained for eighteen months, resigning to accept a position as salesman with the Birmingham Railway, Light & Power Company, in February, 1905. He was subsequently promoted to the position of chief salesman, assistant commercial manager, commercial manager, and general agent, which position he now holds.

**T. Lee Miller**, whose appointment as financial vice-president and efficiency engineer of the Fort Wayne & Northern Indiana Traction Company, with headquarters at Fort Wayne, Ind., was announced in the *ELECTRIC RAILWAY JOURNAL* of Sept. 9, was graduated from Cornell University with the degree of mechanical engineer. Immediately after he was graduated, Mr. Miller became connected with the firm of Marwick, Mitchell & Company, New York, efficiency and cost engineers. While with them he installed the cost and efficiency system for the Buick Automobile Company at Flint, Mich., and also for the Southern Iron & Steel Company of Birmingham, Ala. Upon leaving the last named firm he entered the service of the Toledo Railways & Light Company, Toledo, Ohio, as assistant to F. R. Coates, president. He resigned from that company a year ago last September to become New York manager of sales of the Sangamo Electric Company with particular reference to bringing out the system for the Economy railway meter. It was from the Sangamo Electric Company that Mr. Miller resigned to become connected with the Fort Wayne & Northern Indiana Traction Company. Mr. Miller is an associate member of the American Institute of Electrical Engineers, associate member of the American Society of Mechanical Engineers, member of the American Electric Railway Association, member of the National Electric Light Association, member of the National Geographical Society and a member of the Engineers' Club of New York.



## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

### FRANCHISES

**Peoria, Ill.**—The Peoria & Chillicothe Electric Railway has received a forty-eight-year franchise from the Council to operate over the tracks of the Peoria Railway to and from the north end of Adams Street. The franchise provides that the company enjoy this right free of any charges or assessments.

**Henderson, Ky.**—The city of Henderson has passed a twenty-year electric railway franchise which Mayor Johnson will sign, and which will in all likelihood be sold to the Henderson Traction Company. By the terms of the franchise extensions will be added to the present lines and school children will be provided with half-fare rates.

**Worcester, Mass.**—The Worcester Consolidated Street Railway has received a franchise from the Council to construct a third track in Salem Square. The company was also granted a franchise for an extra track in Salisbury Street to Lincoln Square, to connect its tracks in Channing Street and Cambridge Street and to lay an additional track in West Boylston Street.

**Brooklyn, N. Y.**—The Public Service Commission for the First District of New York has granted the New York Municipal Railway a two years' extension of time to July 27, 1918, in which to complete the construction and begin the operation of the additional tracks on Fulton Street, Brooklyn, and an extension of two years to Feb. 2 1918, to complete the construction and begin operation of additional tracks on the Broadway line.

**Buffalo, N. Y.**—The International Railway has petitioned the City Council for permission to lay double tracks and operate cars in Elmwood Avenue, from Hertle Avenue to the north city line, a distance of almost  $\frac{1}{2}$  mile. No opposition has developed and it is expected this application, together with the company's request for a franchise to lay double tracks and operate cars in Franklin Street from Chippewa to Allen Streets, a distance of  $\frac{1}{2}$  mile, will be submitted to voters for approval at the next general election in November.

**Lackawanna, N. Y.**—Application has been made to the City Council of Lackawanna by George Bullock as receiver for the Buffalo & Lake Erie Traction Company for a franchise to lay tracks and operate cars through Sixth Street from the Hamburg Turnpike and across C Street to property being purchased by the company from the Stoney Point Land Company for the purpose of erecting a carhouse.

**East Cleveland, Ohio.**—The J. L. Free Land Company has received from the Council of East Cleveland a twenty-five-year franchise to construct a line on Noble Road between Euclid Avenue and Mayfield Road. [March 4, '16.]

### TRACK AND ROADWAY

**Selma Street & Suburban Railway, Selma, Ala.**—Plans are being made by this company to build an extension of its Selma Avenue line to the municipal swimming pool.

**Pinellas West Coast Railway, St. Petersburg, Fla.**—It is reported that this company will be in the market for 60-lb. relaying rails for a  $1\frac{1}{2}$ -mile line. H. C. Case, president. [Sept. 9, '16.]

**St. Petersburg-Tampa Railway, St. Petersburg, Fla.**—The survey for this company's proposed line from St. Petersburg to Tampa will be made by C. E. Burleson, St. Petersburg. George S. Gandy, Sr., St. Petersburg, president. [Aug. 12, '16.]

**West Coast Electric Railway, Sarasota, Fla.**—It is reported that Philadelphia capitalists have financed this company's proposed line between Tampa and Sarasota. It is estimated that the cost of the project is about \$700,000. A. E. Townsend, Sarasota, general manager. [Aug. 26, '16.]

**Georgia Railway & Power Company, Atlanta, Ga.**—It is reported that this company's extension to Emory University will be completed by Sept. 27.

**Aurora, Mendota & Western Railroad, Aurora, Ill.**—This company, which proposes to construct a line between Aurora and Mendota, has applied to the Public Utilities Commission of Illinois for permission to issue \$450,000 of stock. [Aug. 12, '16.]

**East St. Louis & Suburban Railway, East St. Louis, Ill.**—Work has been begun by this company constructing new track on Collinsville Avenue from Illinois Avenue to St. Clair Avenue.

**Muscantine, Burlington & Southern Railway, Muscatine, Iowa.**—Plans are being considered for equipping the Muscatine, Burlington & Southern Railway for electrical operation. Negotiations, it is understood, are now under way for the purchase of electric motor equipment.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—A report from this company states that extensive plans are under way for the improvement of the bathing beach and bath houses at Blue Grass Park, prior to the opening of the season in 1917.

**Biddeford & Saco Railroad, Biddeford, Me.**—This company will extend its tracks up North Street to the Eastern division of the Boston & Maine Railroad. It is reported that eventually a loop will be built to connect with the present line at the corner of Elm and Main Streets.

**Bay State Street Railway, Boston, Mass.**—This company is installing a block-signal system on its Fall River and Taunton branch. Work will soon be begun by the company installing iron and steel poles on Main Street, Gloucester, in place of the wooden poles now used.

**Boston (Mass.) Elevated Railway.**—Work has been begun by the Boston Elevated Railway, reconstructing its tracks on Salem Street from Converse Square to Auburn Street; 110-lb. girder rails are being used.

**Worcester (Mass.) Consolidated Street Railway.**—Work will soon be begun by the Worcester Consolidated Street Railway double tracking its line on Hamilton Street.

**United Railways, St. Louis, Mo.**—The northern extension of the Taylor line of the United Railways from Florissant Avenue to Broadway, was opened for regular traffic on Sept. 1. This extension connects the manufacturing district of North Broadway and Baden with the residential districts of West and Northwest St. Louis. The Lee and Seventh Street lines of the company have been merged. The Seventh Street line formerly operated north to Morgan Street and the Lee line south to Pine Street, and thus doubled the congestion. Hereafter the southbound cars will operate east on Carr Street to Broadway, to Elm Street, to Seventh Street, and thence over the old Seventh Street route. Northbound cars will turn east at Seventh and Elm Streets, instead of north, go to Broadway, to Lucas Avenue, and thence over the old Lee line route. The cost of the change was about \$11,000.

**International Railway, Buffalo, N. Y.**—The work of laying double tracks in Bailey Avenue, from Seneca Street to Broadway, more than 2 miles, is being rushed by the International Railway in an effort to complete the work before winter. This is the first of the 6-mile stretch of track to be laid in Bailey Avenue from Seneca Street to the north city line under the new franchise. The line will greatly relieve the congestion on the Fillmore Avenue and Abbott-South Park lines, especially to and from the large mills and other industries in the South Park section of the city. With the completion of this line the company will be in the market for additional equipment. All available cars are now in use during the rush-hour periods. The company has completed the laying of new double tracks in Main Street from the Cold Spring carhouse to Hertle Avenue,  $2\frac{1}{2}$  miles. Work has been in progress since early spring, and despite the heavy north and south bound traffic over this line, service was not seriously interrupted. Cars were operated over a single track for a few blocks at a time while laborers were laying the second track. For a few days while switches and cross-overs were being laid in front of the Cold Spring carhouse, all cars which operated in Main Street were rerouted over East Ferry and Jefferson Streets to Main Street.



**Interborough Rapid Transit Company, New York, N. Y.**—During the week ended Sept. 9 the Public Service Commission for the First District of New York received bids for the installation of tracks on the Seventh Avenue branch of the Lexington Avenue line. The low bidder on the contract was Engel & Hevenor, New York City, the unofficial total of whose bid was \$229,440. The Ramapo Iron Works, New York City, was the low bidder at \$11,427 for the supply of special work, including frogs and switches and necessary appurtenances to be used in the construction of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway. Bids will be received by the commission on Sept. 28 for the construction of a railroad yard in connection with the White Plains Road extension. The yard will be located one block east of White Plains Road and will cover an area of several city blocks. Further references to these contracts are made on page —.

**East Cleveland, Ohio.**—It is reported that construction will be begun this fall by the J. L. Free Land Company on its proposed line on Noble Road between Euclid Avenue and Mayfield Road. The cost of the line is estimated at \$35 000. [March 4, '16.]

**Philadelphia, Pa.**—Following the announcement by Mayor Smith that a \$10,000,000 portion of the new city loan is to be floated by a bond issue Nov. 1, Director Twining, of the department of city transit, announced on Sept. 7 that estimates for work on three sections of the huge subway loop would be called for in a few months and that the contracts would be awarded in January. It is estimated that about one-quarter of this \$10,000,000 will be devoted to transit and port improvement purposes. According to Director Twining, the major portion of the 1917 construction work will have to do with the subway loop and the Frankford elevated. The preliminary plans for this work will be passed upon by the Public Service Commission engineers within a week or so. After this the department will immediately proceed with the plans in detail. Director Twining, speaking of the loop contracts, explained that those for the Eighth Street, the Locust and Arch Streets sections would be awarded first, while the Broad Street section, which involves the more difficult engineering problems, will be awarded two or three months later. Director Twining believes the Frankford elevated will be completed as far as Ridge Street by the end of 1917. Several other contracts, principally for work in the City Hall section, will be awarded some time at the end of the present year, it is said. This will probably include the City Hall station.

**Philadelphia & Garrettford Street Railway, Upper Darby, Pa.**—Work has been begun by this company on the construction of an extension from Parker Avenue, Collingdale, to the Chester turnpike in Sharon Hill. William J. Torrington Company, Philadelphia, has the contract for the work. It is stated that the company contemplates the construction of an extension to Chester.

**Bristol (Tenn.) Traction Company.**—Announcement has been made by this company that on Oct. 1 car service on its 3-mile belt line on the Virginia side of Bristol will be discontinued, owing to jitney opposition.

**Beaumont (Tex.) Traction Company.**—Work has been begun by this company on the reconstruction of its tracks on Magnolia Avenue with heavy rails.

**Marlin-Temple Interurban Company, Marlin, Tex.**—With impressive ceremonies attended by citizens from Marlin and Temple and other towns which the Marlin-Temple Interurban Company will touch, the cornerstone of the bridge over the Brazos River, 6 miles from Marlin, was laid on Sept. 9. S. D. Hanna, chief engineer, said this was the beginning of actual construction work which will be pushed till the road is completed. [Sept. 2, '16.]

**Ogden, Logan & Idaho Railway, Ogden, Utah.**—Construction work has been completed and operation begun on the new cut-off of the Ogden, Logan & Idaho Railway between Hot Springs and Brigham City. The new line is located from  $\frac{1}{2}$  to 2 miles west of the present line between Brigham City and Hot Springs and represents an expenditure of about \$300,000. The old line will be operated from Brigham City to Willard about 8 miles, but for the remainder of the distance to Hot Springs the track will be torn up.

**Puget Sound Traction, Light & Power Company, Bellingham, Wash.**—The Puget Sound Traction, Light & Power Company is expending thousands of dollars this year in improving its roadbed and tracks in Bellingham. The company also is completing the renewal of two bridges across Whatcom Creek, and in addition to this will soon have laid a considerable amount of new 80-lb. rails on Harris Avenue. The Pacific Northwest Traction Company, also of the Puget Sound Traction interests, is making considerable improvements, including roadbed, rails, etc.

**Kanawha Traction & Electric Company, Parkersburg, W. Va.**—The Merydith Construction Company, Marietta, Ohio, has received a contract from the Kanawha Traction & Electric Company to erect a reinforced concrete viaduct. The cost of the viaduct is estimated at \$60,000.

**\*Marengo, Lake Geneva & Northern Railway, Marengo, Wis.**—It is reported that the Cortlandt Engineering Company, New York, has been awarded a contract by the Marengo, Lake Geneva & Northern Railway for the completion of its line from Marengo to Delavan, Wis. A \$700,000 bond issue has been taken by the Cortlandt Engineering Company.

#### SHOPS AND BUILDINGS

**Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.**—This company has awarded a contract to H. A. Maine & Company, Waterloo, for the construction of a new terminal station at Fourth and Mulberry Streets, Waterloo. It is stated that the structure will cost about \$75,000.

**Hutchinson (Kan.) Interurban Railway.**—This company reports that during October and November it will construct a new carhouse with a capacity of twenty-four cars.

**International Railway, Buffalo, N. Y.**—The Frontier Electric Railway, owned by the International Railway, has been granted an extension of time by the North Tonawanda City Council until Aug. 1, 1920, within which to complete the freight terminal which will be constructed in North Tonawanda along the line of the road which it is building between Buffalo and Niagara Falls, N. Y.

#### POWER HOUSES AND SUBSTATIONS

**Arkansas Valley Railway, Light & Power Company, Pueblo, Col.**—This company has recently completed a 1300-volt transmission line 11 miles long from its main line near Manzanola to Olney Springs and Crowley. The energy will be used for lighting and power purposes in the two towns as well as by the farmers and ranchers en route. A line has also been extended to Cheraw.

**Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.**—It is reported that this company is contemplating the construction of an electric plant. T. R. Osmond, St. Augustine, general manager.

**Indiana Railways & Light Company, Kokomo, Ind.**—This company reports that it has purchased one 5000-kw., 80 per cent power factor, General Electric turbo-generator and Wheeler Condenser & Engineering Company surface condenser for delivery next spring.

**Schuylkill Railway, Girardville, Pa.**—This company contemplates the construction of a new power plant at St. Clair.

**Pennsylvania Railroad, Philadelphia, Pa.**—A 20,000-kw., 11,000-volt, 25-cycle, turbine unit complete with a 24 000 sq. ft. surface condenser and auxiliaries, has recently been ordered by the Pennsylvania Railroad from the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa. This turbine is for installation in the company's Long Island City power house, which supplies power for the operation of the Pennsylvania Terminal and the Long Island Railroad.

**Reading Transit & Light Company, Reading, Pa.**—This company will erect a new transmission line to Kutztown.

**Galveston (Tex.) Electric Company.**—This company has purchased additional ground just north of and in the same block with its power station at which current for operating the Galveston traction lines and lighting the city is generated. According to A. H. Warren, general manager, this land is purchased as a site for an addition to the power plant when the same is needed, which is expected within the next few months.



# Manufactures and Supplies

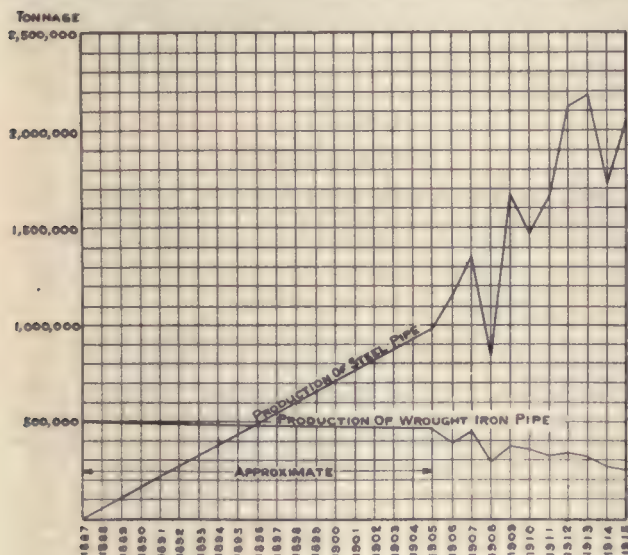
## PRODUCTION OF STEEL PIPE

**Doubles in Last Ten Years Due in Large Measure to Growth of Electric Railways**

In 1896 the production of steel pipe first equalled the production of wrought-iron pipe. Since then the rate of increase in steel pipe production has been very rapid, while the production of wrought-iron pipe has fallen off.

These statements are based on figures issued by the National Tube Company and on statistical data contained in a special bulletin on the production of iron and steel issued by the American Iron and Steel Institute. The data are graphically presented herewith.

The growth of electric railways and their widespread rehabilitation in cities have in no small way accounted for this increased demand for steel piping. Steel piping has a



COMPARATIVE PRODUCTION OF STEEL AND IRON PIPING

great many uses in the electric railway industry. It is employed for steam and other piping and for boiler tubes in power generating stations, and it is used, as well, in very large quantities for street trolley poles as installed within city limits and for trolley car poles, passenger railings, conduits and in the more common services in various railway buildings.

Steel pipe was first made in 1888. The tonnage that year was 300, while last year 2,037,266 tons of skelp was produced for the manufacture of steel pipe.

## TO INCREASE SALES IN THE FAR EAST

**Special Government Agent Rhea Will Start Next Month on Extended Tour to Benefit Manufacturers of Electric Railway Apparatus**

Frank Rhea, who has recently been appointed special agent of the Bureau of Foreign and Domestic Commerce, Department of Commerce, to investigate the field for American railway and tramway supplies in the Far East, expects to leave Seattle Oct. 25 and his first objective point will be New Zealand. He then expects to visit Australia, the Philippines, China, Japan and Manchuria, Straits Settlements, India and South Africa, then go to London, where he expects to arrive in about twenty months. In the meantime he is interviewing manufacturers and others interested in the trade in railway and tramway apparatus in the Far East. Among others seen have been The J. G. Brill Company and the Baldwin Locomotive Works.

As stated in the issue of Aug. 26, manufacturers and

others who wish to get in touch with Mr. Rhea before he leaves this country should address the division of commercial agents, Bureau of Foreign and Domestic Commerce, Custom House New York. This is the new office opened in New York by the bureau to keep in closer touch with business houses interested in foreign trade.

Mr. Rhea has had an experience which well fits him for this investigation of railway trade conditions. After graduation as a civil and electrical engineer from the University of Pittsburgh in 1892, he was a member of the force of the Union Switch & Signal Company for fifteen months. He then went with the Pennsylvania Railroad as foreman of signals at the Broad Street Station for one and one-half years. He resigned from this position to become connected with the Philadelphia Telephone Company, but after a short time returned to the employ of the Pennsylvania Railroad. He was then for five and one-half years signal inspector of the Pennsylvania Lines West and following that for seven years engineer maintenance of way of the same system. This was from 1896 to 1908. In the latter year he joined the General Electric Company, and for five years was connected with the railway commercial engineering department of that company. In 1913 he resigned to join the valuation force of the Interstate Commerce Commission and until his present appointment has been engineer of the Eastern District.

## TRACK BONDING AT A MAXIMUM

**Delayed Work of the Last Three Years Accounts for Large Increase in Bonding**

Notwithstanding the fact that the cost of copper has forced the manufacturers greatly to increase the selling price of rail bonds, the quantity sold so far this year has far exceeded that sold during the corresponding period last year. These statements are confirmed by officials of several bond manufacturers. No doubt the main reason for the comparatively large amount of bonding work that is being done this year is that very little work was done during the years of 1913, 1914 and 1915. Traffic conditions in those years forced the roads to restrict their purchases, and therefore no bonding was done except that which was absolutely necessary. This statement while true for the country as a whole of course does not apply to all roads. Some of the interurban lines which installed signals rebonded all of their tracks within the signalled territory, since good bonding is essential to the proper working of a signal system in which the track rail circuit is required for control.

The Electric Railway Improvement Company, Cleveland, Ohio, reports that for the first half of 1916 it did considerably more business than for the same period in 1915. This company has recently taken over the Cleveland Railbond Company and will manufacture and sell the Cleveland patented bonding machines in addition to promoting the sale of Erico bonding cars and bonds for application by the electric welding process.

Another large manufacturer reports that while his rail bond business for the first half of 1916 was large, as compared with 1915, the orders during July and August fell below those for the previous six months. However, it is to be expected that a reduction in orders will take place as the bond season nears a close.

The largest bonding jobs now under way are in New York City, where the heavy third rails of the New York Municipal Railway and the Interborough Rapid Transit Company's new extensions are being very heavily bonded. The Interborough third rail weighs 175 lb. per yard and will be bonded with bonds having an equivalent of 3,000,000 circ. mil.

## ALUMINUM TRANSMISSION WIRE PROBABLY AVAILABLE DURING 1917

Conditions in the producing and selling divisions of the aluminum industry have been such that for some time the Aluminum Company of America has not been in a position to offer its wires and cables for sale to the electric railway and transmission industries. Notwithstanding the fact that production has been speeded up to the greatest possible extent, the demand for aluminum has been so great that the manufacturer has been constrained to distribute its sales particularly to those fields in which there is no substitute



for aluminum. The price of aluminum has been exceptionally high, due in particular to the European war. One large producing plant in Canada was commandeered by the Canadian government, and this reduced the production. In England the government has restricted the use of aluminum to war materials only, and in this country the improvements in automobile design calling for a greatly increased amount of aluminum per automobile manufactured, coupled with the enormous increase in the number of automobiles sold, has created an abnormal demand for aluminum. However, the Aluminum Company of America, through one of its officials, has stated to a representative of this paper that during 1917 it expects to re-enter the electric railway and transmission fields for the sale of its products and particularly for the sale of its steel core aluminum transmission cable which has given such excellent service during the last few years.

#### A NEW FIRM OF ENGINEERS

F. H. B. Paine, William McClellan and H. T. Campion announce the formation of the engineering partnership of Paine, McClellan & Campion, with offices at 25 Church Street, New York City, and 1420 Chestnut Street, Philadelphia.

Mr. Paine is the son of Charles Paine, prominent a few years ago as a railroad engineer and executive. He began his electrical career in 1886 as a student with the Westinghouse laboratories in Pittsburgh, and during the following twenty years took an active part in many electrical enterprises both in this country and abroad. In 1905 he became general manager of the construction work of the Ontario Power Company. This was the earliest large development of long distance transmission in this country. Later he took charge of the development of the Niagara, Lockport & Ontario Power Company, finally becoming its vice-president and general manager. In 1911 he opened an office in New York as a consulting engineer and counsellor to public utilities. He has specialized in valuations and appraisals, rate-making, management and organization, as well as all problems of intercorporate relations, contracts, etc. During this time the New York Telephone Company called him to become chairman of the committee of appraisal in connection with the New York rate case before the Public Service Commission. He also is the representative of the American Institute of Electrical Engineers on the joint national committee of overhead and underground line construction.

A résumé of Mr. McClellan's life was given on page 378 of the issue of this paper for Aug. 26, when announcement was made of his appointment as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania.

Mr. Campion was connected for a number of years with the Philadelphia Rapid Transit Company and its predecessors, finally becoming assistant to the chief engineer, William S. Twining. His particular responsibilities here were the design and construction of carhouses, substations and powerhouses. About 1905 he left the Philadelphia Rapid Transit Company to take charge of the Philadelphia office of the Reinforced Cement Construction Company, and had charge of the reinforced concrete forebay work of the Ontario Power Company at Niagara Falls. In 1907 he associated himself with Mr. McClellan, mentioned above, to carry on a constructing and consulting engineering business.

#### J. A. HANNA JOINS J. G. BRILL COMPANY STAFF

J. A. Hanna announces that on Oct. 1 he will become associated with The J. G. Brill Company and will resign as vice-president and sales manager of the Niles Car & Manufacturing Company, Niles, Ohio.

The Niles company is now directing its greatest efforts toward the automobile motor truck business. Last year when electric railway car orders were very scarce, it started to build motor trucks in order to keep its shops busy and this business has shown such progress that the major portion of the Niles capital and plant will henceforth be devoted to the manufacture of motor trucks.

Mr. Hanna states that for the present he will retain his office at the Niles Car Works and thus be in position to assist in the completion of Niles car orders still unfilled.

Joe Hanna, as he is familiarly called by so great a number of electric railway men, has been a faithful adherent to the car building business for more than thirty years. He first was engaged in the service of The J. G. Brill Company in 1884 and remained with them seven years as storekeeper, cost estimator, truck expert and salesman. During the following twenty-five years he acted at different times as sales agent for Jewett, Stephenson and Niles cars and for McGuire, Peckham and Baldwin trucks, with offices in New York, Chicago, Philadelphia, Cleveland and Niles. Mr. Hanna on Oct. 1 also will resign as district sales agent for the electric truck department of the Baldwin Locomotive Works.

#### DELIVERIES MADE AS GOODS ARE COMPLETED

Some electrical manufacturers are now so crowded with orders waiting to be filled that some of them are shipping machinery in parts as completed. That is to say, if a generator is ordered, and the exciter is ready for shipment a month or two in advance of the generator itself, the exciter is boxed up and shipped to the buyer, while it may be some weeks after before the generator will arrive. Likewise, if an order came in for a number of motors of different sizes, the buyer would probably receive the motors in odd lots. This has become necessary so as to make available every possible square foot of factory space for operation in spite of the increased shipping cost.

#### ROLLING STOCK

Manhattan City & Interurban Railway, Manhattan, Kansas, is contemplating the purchase of two one-man cars.

Schuylkill Railway, Girardville, Pa., has ordered four cars from The J. G. Brill Company for delivery about Dec. 15.

#### TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the Connecticut Company for 15,000 trolley ears.

Westinghouse Traction Brake Company, Wilmerding, Pa., has received an order for air brake equipment for the forty-two elevated cars recently ordered from the Pressed Steel Car Company by the Boston Elevated Railway.

Homer C. Johnstone, formerly with the Midvale Steel Company, has been appointed manager of the steel department of Gaston, Williams & Wigmore, Inc. Mr. Johnstone served for fourteen years as manager of the Chicago and New York offices of the Midvale Company and is well known in the steel trade.

Edison Storage Battery Company, Orange, N. J., announces the opening of its Los Angeles office in the San Fernando Building. James F. Rogan, who has been acting as local distributor of Edison storage batteries at Los Angeles, will become resident manager. This company also maintains two other offices on the Pacific Coast, one at 206 First Street, San Francisco, in charge of District Manager E. M. Cutting and another at 65 Columbia Street, Seattle, with F. C. Gibson as resident manager.

#### ADVERTISING LITERATURE

Carnegie Steel Company, Pittsburgh, Pa., has issued a pamphlet on bulb sections.

General Electric Company, Schenectady, N. Y., is distributing a booklet entitled "Railway Line Material for Direct Suspension," containing detailed descriptions of overhead line devices.

Stow Manufacturing Company, Binghamton, N. Y., has issued bulletin No. 100 on electric motors; bulletin No. 101 describes and illustrates electric tools and bulletin No. 102 on flexible shafts.

Lincoln Electric Company, Cleveland, Ohio, has issued a booklet on induction motors for 2 or 3-phase alternating current. This booklet contains a number of illustrations showing installations.

Alexander Milburn Company, Baltimore, Md., has issued a booklet on oxy-acetylene welding and cutting apparatus. This booklet outlines the process of welding and cutting and contains a number of illustrations which show the equipment in operation.





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Each of the old Irish kings had in his service a champion called **Aire-echta**. One of his duties was to keep watch at the most perilous fords or passes—the **bearna boaghail** or gap of danger.

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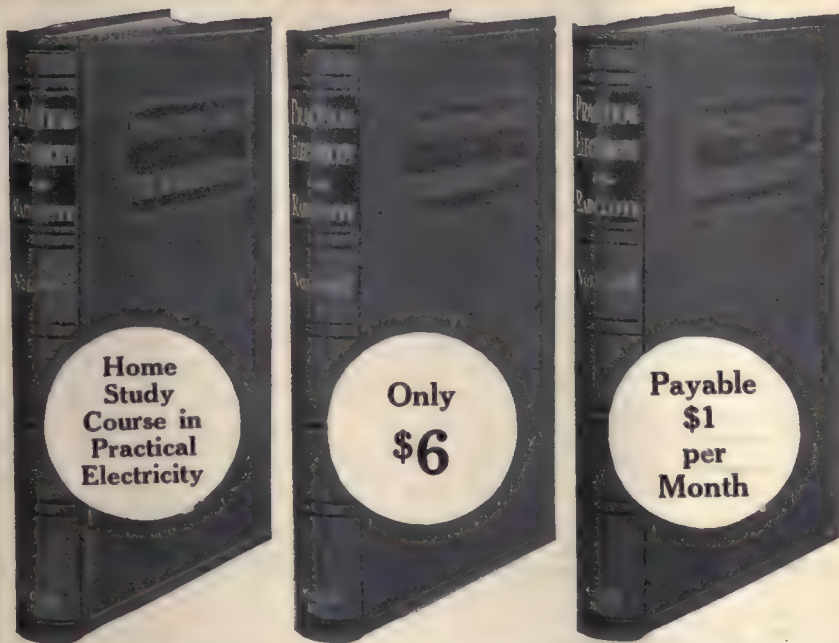
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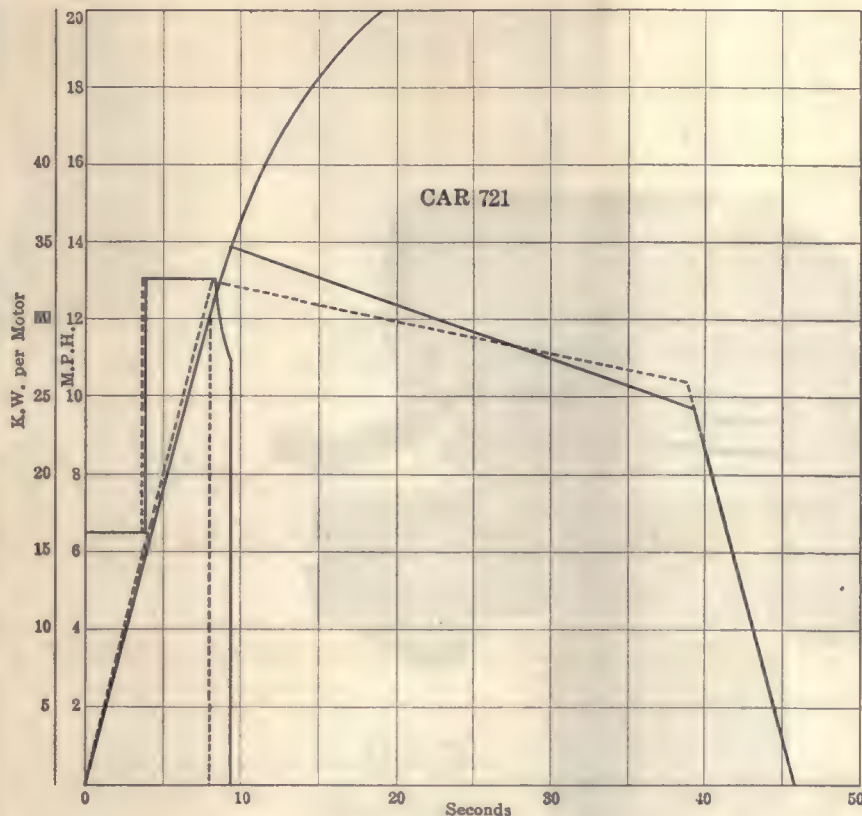
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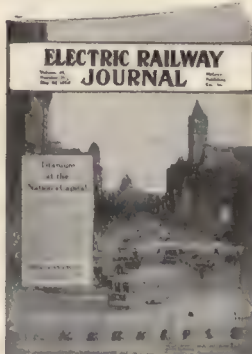
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EQUIPMENT FOR EVERY ELECTRICAL NEED.  
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## Protect Cars and Power-plant

Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

## ECONOMY renewable cartridge FUSES

when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



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Write now for Bulletin No. 17 and our catalog.

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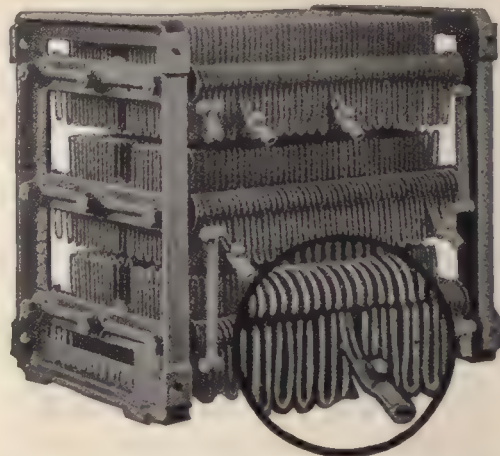


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# DRAWN



No word in the English dictionary means more to the user of E M B resistors than the one word *drawn*.

It means rustproof, uniformity of cross-section, reduced weight, and almost indestructibility.

*Cost* is the antithesis of *drawn*. The antithesis is to be avoided if you would get what you pay for in resistors.

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## HARDY'S S S METAL

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All new metals of the best grades obtainable. Always uniform in composition.

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Armature and Axle Bearings. Adheres firmly to types of motors with iron shell or composition bearings.

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## H. B. LIFE GUARDS

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The Consolidated Car Fender Co.

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General Sales Agents

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Reliability is the primary essential of street railway gearing and as this implies durability also and consequently involves economy the best gearing obtainable is none too good.

That's why "VAN DORN" gearing is the choice of so many important street railway companies.

*We want to figure on your requirements if you want this kind of gearing.*

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The  
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Company  
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Special attention  
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## F. C. S. Wheels

during the process  
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The tread and flange are chilled iron, the best known wear-resisting metal.

Their use on city and interurban railways all over the country demonstrates their superior qualities.

Low cost and high mileage make them an economical wheel.

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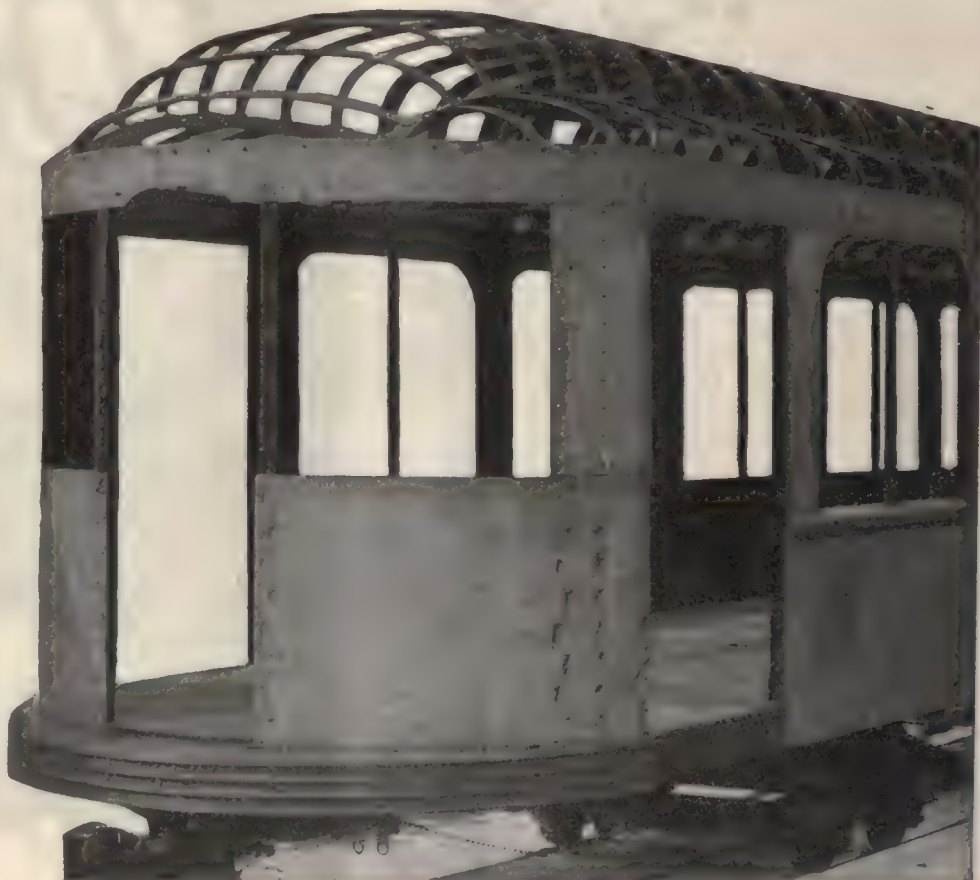
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Represent highest  
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Let us figure on  
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The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

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Best steel pole in the world for electric railway trolley service, **STRONGEST, LIGHTEST, MOST ARTISTIC, LOWEST IN PRICE, QUICKEST DELIVERIES.**

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offer all the advantages without the disadvantages of the groove rail.

Construction approved by City Engineers.

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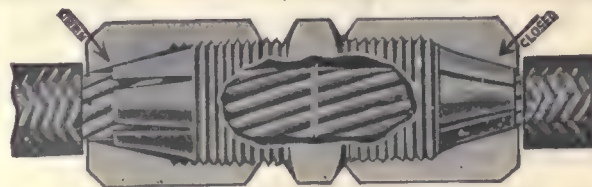


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## Fibre Track Insulation

**DIAMOND STATE FIBRE CO.**

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## Splicing Without a Blow-Torch

No blow-torch—no solder—no skill—is required with

## FRANKEL SOLDERLESS CONNECTORS

Patented Feb. 19, 1907; July 30, 1907; May 25, 1909

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No. 1 to sweep crossings.

No. 2 to handle light dirt and snow in the frogs, switches, and curves.

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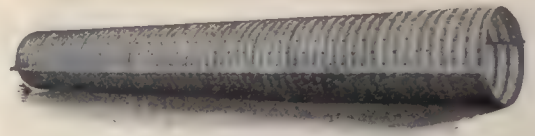
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The "ACME" of Culvert Perfection



Improved construction.  
Triple reinforced-ends (patented).  
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Rust-resisting.  
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MANUFACTURERS  
CANTON, OHIO, U.S.A.

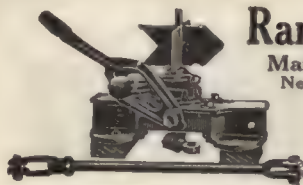
## BARBOUR STOCKWELL CO.



205 Broadway, Cambridge, Mass.

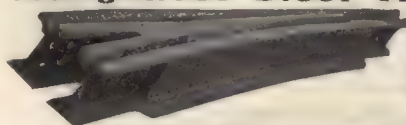
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Automatic Switch Stands,  
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Crossings, Switches, Etc.

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FROM THE  
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Whether you have many or few the LINCOLN BONDING SYSTEM is the economical bonding system for you. If you would know why see our advertisement on page 16 of the September 9, 1916, issue of Electric Railway Journal.

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### TRACK SPECIAL WORK




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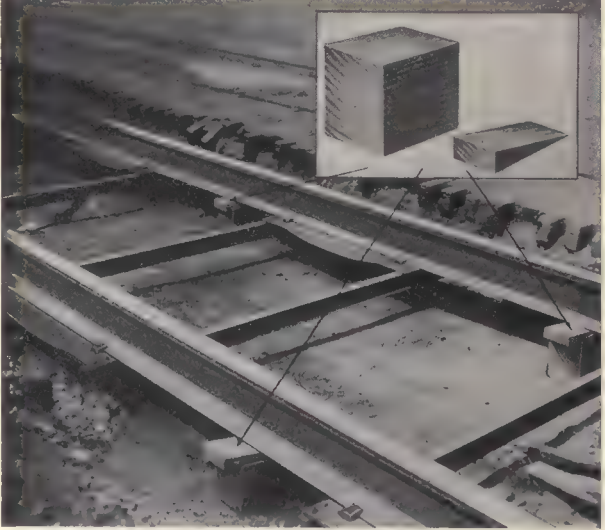
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Insure uniform superheat at temperature specified

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**PUT** the block under the track, insert a wedge each side the rail, and drive up—only a few seconds' time required to finish the job with

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Blocks 6x8x8; Wedges 2x4x8, tapered one side. Their use means greater speed, better quality of work, and higher earning power from the men. Thousands in use by prominent Traction Companies.

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Largest Makers of Oxy-Acetylene Welding and Cutting Equipment in the World.

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## I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

## KINNEAR Steel Rolling Doors FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fire-proof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the

**KINNEAR MANUFACTURING CO.,** Columbus, Ohio  
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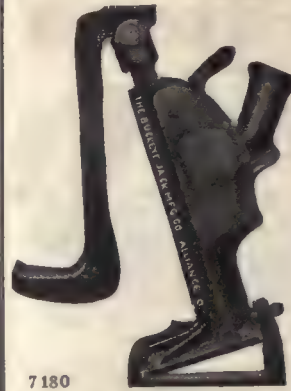
## Continuous Operation of the Power Plant

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The constant use of Dearborn Treatment guarantees a high percentage of efficiency from the boilers. Made to suit the water conditions shown by analysis, it keeps the boilers free from scale, so that they steam freely and quickly, all corrosive or pitting action of the water is arrested, and, in fact, the boilers are in condition to yield their full quota of power constantly, while the fuel consumption is greatly reduced.

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An extra powerful and handy Jack for extra difficult jobs.

**Forged Parts are  
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This Jack can be worked from many angles to load, yet full lifting power is available from any position. Write for catalog, details and price.

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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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Steam Superheaters      Mechanical Stokers

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FOR THE MANUFACTURER—OPERATOR—REPAIRER

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We gladly assist in selection.

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**RAISES** the possibility of efficient stoking to a maximum.

Write for catalog "C."

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The MODERN WAY of handling ASHES:  
**GECO Pneumatic Ashhandling Systems**  
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Bulletin 1—Green Chain Grate Stokers.  
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used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

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Protect Iron and Steel  
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Rust and Electrolysis

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Try these boxes on your one-  
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## The Infallible Signal: Consolidated Buzzer System

gives the motorman an unmistakable stop-signal when passengers wish to alight.

### "It Rings From the Trolley"

—operates directly from the trolley voltage—does away with bulky, short-lived dry batteries.

The button is compact and sturdy too—no need to fumble for it—it's right at finger's end.

It smooths the kinks out of the service because it gives the stop-signal every time the button is pressed—and it cuts maintenance cost. Catalog 10, which goes into detail, is yours for the asking.

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Barrett Track and Car Jacks  
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Duff Ball Bearing Screw Jacks  
Duff Motor Armature Lifts

The Duff Manufacturing Co., Pittsburgh, Pa.

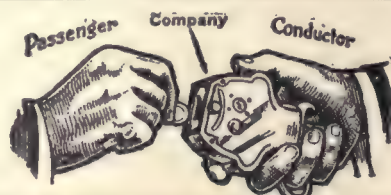
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**D & W Fuses, Deltabeston Wire  
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**STANDARD**  
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This is the hub bearing of a HENSLEY Trolley Wheel after the rim is worn out.

HENSLEY Wheels require no bushing and maintain a perfect bearing in the hub until ready to be scrapped.

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The National Standard  
for Car Curtains and  
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The only headlining made in one solid piece. Will not separate, warp or blister. Waterproof and homogeneous.

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General Offices: Pittsburgh, Pa.

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WRITE FOR THERMOSTATIC CONTROL INFORMATION

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**ELECTRIC HEATERS** Cut Installation and Maintenance Charge.

**VENTILATORS** Also Ventilate in Stormy Weather.

**THERMOSTATS** Save Current.

**ORIGINATED** the use of NON-CORROSIVE Wire for Electric Car Heaters.

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We base all our "ads" on facts. We guarantee TULC and stand back of it. Others have shown a large saving with TULC. It has been proven to be the best lubricant.

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Schofield Building CLEVELAND, O.



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Made and impregnated to withstand the elements  
Only One Color Coat Necessary at Home

Made from a closely-woven special fabric, every fibre of which is treated with a preservative which renders it proof against the quick deterioration to which ordinary painted cotton duck is susceptible. Neat in appearance—saves time, maintenance and prevents leakage. Three weights, yellow and brown, widths from 22 to 120 inches. Compare the samples!

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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For the Answer to your Fare Collection Problems  
Write for

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It tells how the

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The Bonham Recorder Co., Hamilton, Ohio



Use the experience of others in the treatment of boiler scale and you will use

### DIXON'S BOILER GRAPHITE

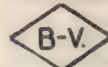
Saves disagreeable work and makes cleaner boilers. Booklet No. 108-T upon request.

Made in Jersey City, N. J., by the

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Works: New Kensington, Pa.

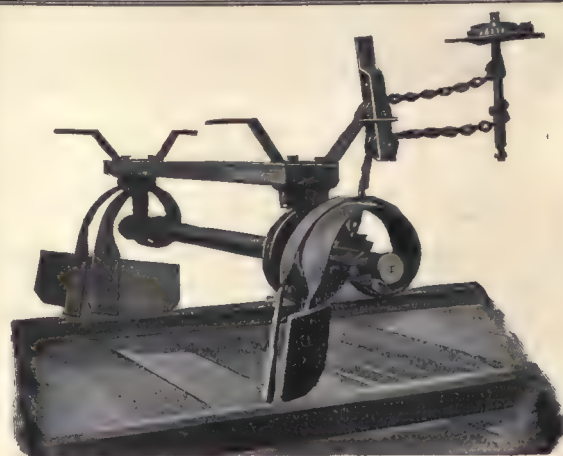
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Missouri Trust Bldg., St. Louis, Mo.

## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



**THE STAR BRASS WORKS**  
KALAMAZOO, MICH., U. S. A.



## Snow Need Not Cripple You if your cars are equipped with Root Spring Scrapers

They clean the groove and rail so thoroughly that your schedule can be maintained regardless of a severe storm. Made in several sizes. Will fit any car. No. 6 is built for heavy snow removal work. It not only cleans the track but keeps it clean a safe distance on both sides of the track. No. 7 is especially adapted to low cars, and will work both forward and backward. Other types for every service. Get ready now for winter.

*We can ship them promptly.*

**Root Spring Scraper Co.,** Kalamazoo, Mich.

## SEVEN THOUSAND TROLLEY POLES IN STOCK

Not Gas Pipe but High Carbon, Butt-Welded Poles Made from Special Skelp and Capable of Standing 35 to 40 Pounds Wheel Pressure on the Trolley Wire. Immediate shipment.

**NUTTALL - - PITTSBURG**

## The "Nycap=Exide" Battery

for  
**STORAGE BATTERY STREET CARS**  
**THE ELECTRIC STORAGE BATTERY CO**  
PHILADELPHIA

## RAILWAY UTILITY CO.

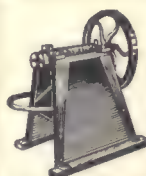
*Sole Manufacturers*

**"Honeycomb" and "Round Jet" Ventilators**  
for Monitor and Arch Roof Cars, and all classes of buildings; also  
**Electric Thermometer Control**  
of Car Temperatures.

**721 W. FULTON ST.** Write for **1328 BROADWAY**  
Chicago, Ill. Catalogue **New York, N. Y.**

## S-W Shim Slack Adjusters Save Brakeshoes and Labor

**SMITH-WARD BRAKE COMPANY, Inc.**  
17 Battery Place, New York  
**W. R. Kerschner Co., Inc.**  
Eastern Sales Agents  
50 Church St., New York City



Saved from the Ashes as many tickets are, means nickels lost to you. Avoid the risk

**Patten Ticket Destroyer** is used right in the office under the eyes of trustworthy employees.

It mutilates beyond redemption.

Scrap sold will pay for the machines.

*Ask us for Circular J.*

**PAUL B. PATTEN CO.,**

78 Lafayette St., Salem, Mass., U. S. A.



# SEARCHLIGHT SECTION

## FOR SALE

- 2—Cincinnati fourteen bench open car bodies.
- 8—Brill fourteen bench open cars, West. 56 Motors, Brill 22-E Trucks.
- 40—Brill ten bench open cars, West. 68 Motors, Peckham Trucks.
- 16—42' Interurban Cars, Baldwin Trucks, 4 West. 121 Motors.
- 25—Brill 20' Closed Cars, 2 West. 56 Motors, Brill 22-E Trucks.
- 40—Brill 20' Closed Cars, G.E. 1000 Motors, Peckham Trucks.
- 6—Brill 30' Express Cars complete, 4 G.E. 1000 Motors, Brill 27-G Trucks, AA-1 Air Brakes.
- 30—G.E. 90 Railway Motors complete.
- 20—G.E. 73 Railway Motors complete.
- 40—G.E. 1000 Railway Motors complete.
- 20—G.E. 800 Railway Motors complete.
- 18—G.E. 87 Railway Motors complete.
- 18—G.E. 57 Railway Motors complete. Form H.
- 12—G.E. 57 Railway Motors complete. Form A.
- 22—West. 12A Railway Motors complete.
- 12—West. 38B Railway Motors complete.
- 10—West. 112 Railway Motors complete.
- 18—West. 101-B-2 Armatures, Brand New.
- 6—West. 93-A-2 Armatures, Brand New.
- 2—West. 93 Armatures, Brand New.
- 14—G.E. 80-A Armatures, Brand New.
- 4—G.E. 87 Armatures, Brand New.
- 3—G.E. 73-C Armatures, Brand New.
- 6—G.E. 67 Armatures, Brand New.
- 12—G.E. 57 Armatures, second-hand, two turn.
- 14—West. 56 Armatures, second-hand.
- 40—K10 Controllers.
- 12—K28B Controllers.
- 26—K6 Controllers.
- 22—K11 Controllers.
- 12—K14 Controllers.
- 6—Brill 21-E Trucks, 7' 6" and 8' wheel base.

All of the above Apparatus is in first class condition for immediate service

For further particulars apply to

**W. R. KERSCHNER COMPANY, Inc.**  
50 Church Street, New York City

## At Your Service:

### A BIG, EFFICIENT ORGANIZATION

We are doing an annual business of \$200,000 to \$400,000 in the Electric Light and Power, Traction, Telephone and Telegraph fields. But we are capable of bigger things, and wish to serve as sales representatives for one or two non-competitive lines in the above fields.

Our sales organization thoroughly covers the territory North of Tampa and East of Chicago, and has served over 2,700 customers.

We are now in our thirteenth year—we have excellent financial ratings—we enjoy the exclusive patronage of most of our customers, and the complete confidence of all.

If your product is not intensively distributed in our territory, you will find it profitable to address

Box 1161,  
Electric Railway Journal.

## ARCHER & BALDWIN

114-118 Liberty Street New York City

TELEPHONE 4337-4338 RECTOR

Rotary Converters, 25 Cycle

- 2—150 K.W. General Electric type T.C. 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 rpm., complete with 4-60 K.W. General Electric, type H, 25 cycle, 380/13,200 volt, oil cooled, single phase transformers.

Rotary Converters, 60 Cycle

- 2—150 K.W. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 RPM., complete with 4-100 K.W. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

Above will be sold with or without transformers.

### Railway Motors

- 4—75 to 90 H.P. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

## MACGOVERN & COMPANY, Inc.

FRANK MACGOVERN, Pres. & Gen. Mgr.

114 LIBERTY STREET

NEW YORK CITY

### Steam and Electrical Machinery

**Air Compressors, Pumps, Hoists, etc.**

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE

WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

### NEW TOOL STEEL, GEARS and PINIONS FOR SALE

- 8—G.E. 73-C Gears 64 Teeth 6" Bore, split.
- 18—G.E. 73-C Pinions 21 Teeth.
- 28—West No. 112 Gears 67 teeth 5" Bore, Split.
- 30—West No. 112 Pinions 22 teeth.

For further information apply

**Storekeeper, TORONTO & YORK Radial**  
TORONTO, CANADA

### Do You Want a Salesman or Other Assistant?

If so, send us copy for a card under "Positions Vacant" in the Searchlight Section. The cost will be slight and the result will be both quick and satisfactory.

**Get your Wants into the Searchlight**

ELECTRIC RAILWAY JOURNAL, 239 West 39th St., New York



# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplayed advertisements cost **two cents a word**, minimum charge 50 cents an insertion, payable in advance.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Desk Room Wanted or For Rent, Business Opportunities, Employment Agencies, and Miscel-

laneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplayed advertisements cost **three cents a word**, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost \$2.40 an inch.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

1/2 p. (1 1/2 x 3 3/4 ins.)	\$5.00	1 in. (1 x 2 1/2 ins.)	\$3.00
1/2 p. (2 1/2 x 3 3/4 ins.)	10.00	4 inches (4 x 2 1/2 ins.)	11.60
1/2 p. (5 x 3 3/4 or 2 1/2 x 7 ins.)	20.00	8 inches (8 x 2 1/2 ins.)	22.40
1/2 p. (10 1/2 x 3 3/4 or 5 x 7 ins.)	40.00	15 inches	40.50
1 page (10 1/2 x 7 ins.)	30 inches		\$80.00

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page	\$80 a page	18 pages	\$56 a page
3 pages	72 a page	26 pages	53 a page
6 pages	64 a page	40 pages	52 a page
12 pages	58 a page	52 pages	50 a page

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### FOR SALE

#### Life Guards for Sale

11 H.B. Life Guards complete, equal to new. Address W. R. Kerschner Company, Inc., 50 Church St., New York.

#### Machinery for Sale

The following three phase, 60 cycle horizontal Curtis turbines and other apparatus will be available for deliveries as stated: 1000 kw. turbine, 1800 r.p.m., 4500 volts, with Worthington surface condenser and auxiliaries. Can be reconnected for 2300 volts. Delivery in September. Box 1168, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### PRACTICALLY NEW

2,200 tons 60-lb. A. S. C. E. Steel

# RAILS

The Best We Ever Handled

## ZELNICKER IN ST. LOUIS

423 1st Nat. Bank Bldg. Chicago  
910 Hennen Bldg. New Orleans

### MISCELLANEOUS WANTS

#### Railway Motors Wanted

Four second-hand railway motors in good condition, 500 volt, 125 to 150 hp. Box 1191, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### WANT IMMEDIATELY

30 Westinghouse 101-B2 railway motors. Describe condition, price, delivery, first letter.

Box 1189, Electric Railway Journal  
1570 Old Colony Building, Chicago, Ill.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

CHIEF electrician of 20 years' experience wants a job. Anything considered. Box 1163, Elec. Ry. Jour.

ENGINEER desires change, at present maintenance of way engineer of 165 mile railway. Technical graduate and six (6) years' experience in street railway operation. References furnished upon request. Box 1176, Elec. Ry. Jour.

FOREMAN painter. Young man of broad experience and proven ability. Sixteen years with various car building and street railway companies. Thoroughly familiar with piece work. Box 1181, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MASTER mechanic seeking better position—is now in charge of all rolling stock and electrical equipment on important interurban. Has a record for resourcefulness in work and for low cost in maintenance on two properties. Address Box 1138, Elec. Ry. Jour.

SUPERINTENDENT of large interurban road wishes to make a change. Steam, city and interurban experience, 12 years with present company. Correspondence solicited. Box 1186, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

### POSITIONS VACANT

AUDITOR for car plant, building all kinds of steel and wooden cars for domestic and export use. Man required must have thorough knowledge of accounting and cost work on car construction. No other need apply. Good position and salary for man possessing these qualifications. Plant ideally located. Applications will be privately examined by financial officer and treated as extremely confidential. Box 1170, Elec. Ry. Jour.

### POSITIONS VACANT

CORRESPONDENT thoroughly acquainted with electric railway organization methods. Young man of some years' actual experience in electric railway executive offices preferred. Must be able to write strong, forceful letters. Salary to start \$125 a month. Future depends on the man. Location, New York City. Application must state education and experience in detail, and give age and references. Box 1184, Elec. Ry. Jour.

SECOND engineer familiar with operation Curtis turbines, surface condensers, stokers and gas engines wanted. Give experience, references and wages expected. Plant in Middle West. Box 1186, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

WANTED—Young man having experience in way and structure and shop accounting, to fill like position with large traction line. Application should state experience, present occupation, age, and salary desired. Box 1190, Elec. Ry. Jour.

### AGENTS AND SALESMEN

#### Salesman Wants Position

Technical man wants general line railway supplies and specialties for this territory on commission. Bank references. J. L. Morgan, Kans. City Life Bldg., Kansas City, Mo.

#### Can Produce the Business

Experienced railway supply salesman desires new connection. Is energetic, a hard worker and producer of new business. Well acquainted with trade. Box 1187, Elec. Ry. Jour.

## Salesman Wanted

Experienced Salesman, preferably technical education, by manufacturer to sell to electric street railways and engineers in Chicago and vicinity. Give complete past experience, references, etc.

Box 1192, Elec. Ry. Jour., 1570, Old Colony Bldg., Chicago, Ill.

Get Your Wants into  
the Searchlight



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

**Acetylene Apparatus.** (See Cutting Apparatus, Oxy-Acetylene.)

**Acetylene Service.**  
Oxweld Acetylene Co.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Alloys, Steel & Iron.**  
Titanium Alloy Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Anchors, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Automobiles and Busses.**  
Brill Co., The J. G.  
White Co., The.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
U. S. Metal & Mfg. Co.  
Westinghouse Elec. & M. Co.

**Babbitting Devices.**  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Bankers and Brokers.**  
Halsey & Co., N. W.  
Redmond & Co.

**Batteries, Dry.**  
Johns-Manville Co., H. W.  
Western Electric Co.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings and Bearing Metals.**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
More-Jones Brass & M. Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Oilers, Graphite Bronze & Wood.**  
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**  
Guerny Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.

**Bearings, Roller Side.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.

**Blow Torches for Soldering and Brazing.** (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Boiler Coverings.**  
Johns-Manville Co., H. W.

**Boiler Graphite.**  
Dixon Crucible Co., Joseph.

**Boilers.**  
Babcock & Wilcox Co.

**Bond Clips.**  
Electric Railway Improv. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improv. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improv. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improv. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Roebbing's Sons Co., John A.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Bonds, Welded.**  
Lincoln Bonding Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms.** (See also Poles, Ties, Posts, Piling and Lumber.)  
American Bridge Co.  
Bates Expanded Steel Truss Co.  
Electric Ry. Equipment Co.  
Electric Service Supplies Co.  
International Creco & C. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

**Brake Adjusters.**  
Johns-Manville Co., H. W.  
Barbour-Stockwell Co.  
Kerschner Co., Inc., W. R.  
Smith-Ward Brake Co.

**Brake Shoes.**  
American Brake S. & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Westinghouse Trac. Brake Co.

**Brazing.** (See Welding.)

**Bridges & Buildings.**  
American Bridge Co.

**Brooms, Track, Steel or Rattan.**  
Paxson Co., J. W.  
Western Electric Co.

**Brushes, Carbon.**  
Calebaugh Self - Lubricating Carbon Co.  
Dixon Crucible Co., Joseph.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Brush Holders.**  
Anderson Mfg. Co., A. & J. M.

**Bumpers, Car Seat.**  
Electric Service Supplies Co.

**Bunkers, Coal.**  
American Bridge Co.

**Bunting.**  
Boyle & Co., Inc., John.

**Bushings, Fibre.**  
Diamond State Fibre Co.

**Bushings, Graphite & Wooden.**  
Bound Brook Oil-less Bearing Co.

**Bushings, Case Hardened Manganes.**  
Bemis Car Truck Co.

**Buttons.** (See Badges and Buttons.)

**Cables.** (See Wires and Cables.)

**Carbon Brushes.** (See Brushes, Carbon.)

**Car Equipment.** (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

**Car Trimmings.** (For Curtains, Doors, Seals, etc., see those Headings.)

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Self-Propelled.**  
Electric Storage Battery Co.  
General Electric Co.

**Cars Stop, Automatic.**  
Consolidated Car Heating Co.

**Castings, Brass.**  
Frankel Connector Co.  
More-Jones Brass & M. Co.

**Castings, Composition or Copper.**  
Anderson M. Co., A. & J. M.

**Castings, Gray Iron and Steel.**  
American B. S. & Fdry. Co.  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. & W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
St. Louis Steel Fdry.  
Standard Steel Works Co.  
Union Springs & Mfg. Co.

**Castings, Malleable and Brass.**  
American Brake S. & Fdy. Co.  
Bemis Car Truck Co.  
Long Co., E. G.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**  
Electric Service Supplies Co.  
Eclipse Railway Supply Co.  
Holden & White.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Union Electric Co.  
Wood Co., C. N.

**Ceiling, Car.**  
Pantasote Co., The.

**Chargers, Storage Battery.**  
General Electric Co.

**Cheese Cloth.**  
Boyle & Co., Inc., John.

**Chemists.**  
Little, Arthur D., Inc.

**Circuit Breakers.**  
Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Clamps.**  
Frankel Connector Co.

**Clamps and Connectors, for Wires and Cables.**  
Anderson M. Co., A. & J. M.  
Dossert & Co.  
Electric Service Supplies Co.  
Electrical Engineers' Equipment Co.  
General Electric Co.  
Klein & Sons, M.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.** (See also Snow-Plows, Sweepers and Brooms.)  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Van Dorn & Dutton Co.  
Western Electric Co.

**Cleats, Car Wiring.**  
General Electric Co.

**Clusters and Sockets.**  
General Electric Co.

**Coal and Ash Handling.** See Conveying and Hoisting Machinery.)

**Coil Banding and Winding Machines.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
Western Electric Co.





**Don't Buy**  
new field coils  
**Don't Sell**  
old field coils

## Exchange

your old field coils for new coils

Just send your old coils to us. We'll remove the old insulation, clean and anneal the wire and reinsulate it with

## Salamander Pure Asbestos

A guarantee of long life and dielectric strength. Then we'll rewind the wire into new coils of the same physical characteristics as the old coils. It amounts practically to an exchange, for our only charge is a trifling one for the actual insulation used. It's cheaper than buying new coils. It's better than selling old coils. Try us and see.

**Independent Lamp & Wire Co., Inc.**

Offices: 1737 Broadway, New York  
Factories: York, Pa., and Weehawken, N. J.

## For General Testing

in Electric Power Plants, or for Outdoor Work

# Weston

Model 45

## D. C. Portable Ammeters and Voltmeters



Designed to meet the demand for a medium-priced Ammeter and Voltmeter. Their accuracy is guaranteed within 1 per cent.

They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1/10 of a division at any part of the scale.

In mechanical and electrical workmanship the Weston Model 45 Portable Ammeters and Voltmeters practically attain perfection.

A full description will be found in Bulletin 501, which will be mailed to you on request.

## Weston Electrical Instrument Co.

21 Weston Ave., Newark, N. J.

New York	Chicago	Detroit	St. Louis	Montreal
Boston	Buffalo	Pittsburgh	Toronto	Florence
Philadelphia	Cleveland	Denver	Winnipeg	Paris
Richmond	Cincinnati	San Francisco	Vancouver	London

## THERE IS A VAN DORN COUPLER

for every condition and every requirement.

Send for information and blueprints.

**VAN DORN COUPLER CO.,**

2325 So. Paulina St.

Chicago, Ill.



"Trade Mark Reg. U. S. Pat. Off."

## Samson Spot Waterproofed Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 SAMSON CORDAGE WORKS, BOSTON, MASS.

## ELECTRIC RAILWAY DEVICES

Rectifier for Frozen Air Pipes.  
High Power Compact Hand  
Brakes, Gear or Differential Types.

Sterling Light Weight  
Boiler Bearing Trolley  
Bases.  
Screenless Air Cleaners  
for Compressors  
Sterling Sand Boxes.  
Berg Fenders and Wheel  
Guards.



Multi-Vapo-Gap Lightning  
Arresters and Hydrogrounds.  
Trigger Lock Reversible  
Controller Fingers.  
"Q-P" Trolley Catchers.  
Soldered Rail Bonds.  
Friction and Insulating  
Tapes.  
Sterling Ticket Punches.  
Controller Handles.

**LORD MFG. CO.,**  
105 W. 40th St., New York

## The Eclipse Railway Supply Co. CLEVELAND, OHIO

Manufacturers of the

**ECLIPSE LIFE GUARD**

**ECLIPSE TROLLEY RETRIEVER**

**ECLIPSE WHEELGUARD**

**ACME FENDER**

## U. S. Metal & Mfg. Co.

165 BROADWAY,  
Chicago

NEW YORK CITY  
Washington, D. C.

## RAILWAY SUPPLIES

### SELLING AGENTS FOR

Tool Steel Gears and Pinions

Johnson Fare Box

Perry Side Bearings

Hartman Centering Center Plates

Wasson Trolley Bases

Garland Ventilator

Electric Arc Welders

High Class Railway Varnishes

and Enamels

Chillingworth Seamless Gear Cases

Special Agents for {  
Tool Steel Gear & Pinion Co.  
Johnson Fare Box Co.  
C. & C. Electric & Mfg. Co.  
Holden & White

General Agents for Anglo-American Varnish Co.

Eastern Agents for Union Fibre Co.

Southern and New England Agents for Thayer & Co.



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

**Coils, Armature and Field.**  
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D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Roebbling's Sons Co., John A.  
Western Electric Co.  
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Westinghouse Trac. Brake Co.

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Frankel Connector Co.

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Electric Service Supplies Co.  
International Register Co., The  
Long Co., E. G.  
Roebbling's Sons Co., John A.  
Samson Cordage Works.

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Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., C. N.

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Boyle & Co., Inc., John.

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Brill Co., The J. G.  
Cincinnati Car Co.  
Long Co., E. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. Brake Co.

**Cranes. (See also Hoists.)**  
Niles-Bement-Pond Co.  
Van Dorn & Dutton Co.

**Cresosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**  
International Steel Tie Co., The.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

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Dixie Culvert & Metal Co.  
Hardesty Mfg. Co., R.  
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Hale & Kilburn Co.

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White Companies, The J. G.  
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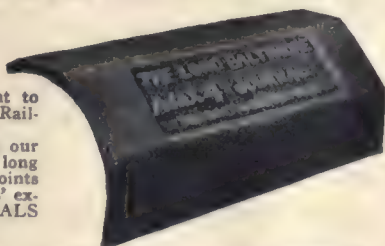
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**Rail Welding. (See Brazing and Welding Processes.)**

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Columbia Machine Works & Malleable Iron Co.—Car & Shop Equipment.

Miller Trolley Shoe Co.—Trolley Shoes.

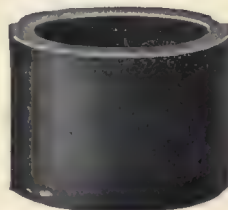
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# THE CINCINNATI CAR COMPANY

WORKS:  
WINTON PLACE  
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## Kurrab

A diminutive donkey struggling under the ponderous weight of some fat sheik and, following closely behind, his wife on foot balancing a big water jug.

That is the impression you carry back as the Nile skyline.

"Inhuman, fat, thick-skull, typical man," (Kurrab, for short), exclaims the tourist suffragette on seeing the poor wife struggling along behind the riding husband.

But he isn't cruel at all—it is the custom and he doesn't think about the wife, and for the same reason the wife doesn't think about the work. They are blindly following the customary groove.

We sometimes share the feelings of the suffragette when we see an unthinking purchasing agent buying the old type of carbon brush out of habit, unmindful of the extra amount of work that brush imposes on the poor operators.

—unmindful of the high brush cost per year that cheap carbon brushes produce.

—unmindful of the fact that a Morgan engineer could prescribe a type of Morganite brush to save all this work and worry and cost.

But there'll come a time, mark you—there'll come a time.



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# Titanium-Treatment Improves All Steels

Do you know that the Bay State Street Railway has improved upon its Mayari rails—made from the famous Cuban nickel-chrome ore—by the use of Titanium-treatment?

These Titanium-treated Mayari rails, as ordered for service at Fall River and Methuen, Mass., comprise 300 tons of 9-in. girder rail and 50 tons of 9-in. guard rail.

They received the usual cleansing with 0.1% titanium.

Titanium-treatment makes good rails better.

Write for our new book **now**.



Titanium-Treated Rails in use at Fall River, Mass.

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VIEW OF TRUCK EQUIPPED WITH ROLLER BEARINGS

# ROLLWAY BEARINGS

## An Illuminating Summary

"Summing up the situation in regard to roller bearings, some of the advantages of their use may be enumerated as follows: Decrease of power, especially at peaks and during acceleration; more coasting; low lubrication and maintenance costs; reduced axle fractures; reduced pull-ins; fewer cars needed, reducing the investment, and possible adoption of smaller motors, and, therefore, less waste.

"The reduced energy demand means, in addition, wear on trolley wire and trolley wheels. With bearings of the anti-friction type, the axles are kept in the exact alignment, while with plain bearings there is considerable lost motion due to journal brass movement in the journal boxes, and to the ends of the journal being pushed to one side of the journal brass. With the anti-friction bearings there is also a reduction in brakeshoe and wheel wear. A car equipped with these bearings will coast further than one with plain bearings, and will accelerate at a higher rate with the same current."

(From an article entitled "Results Obtained with Roller Bearings on Interurban Cars" by W. B. Voth and A. C. Metcalfe, respectively Chief Engineer and Master Mechanic Empire United Railways, Inc., Syracuse, N. Y.)



*Think it over*

**The Railway Roller Bearing Co.**

SYRACUSE, N. Y.





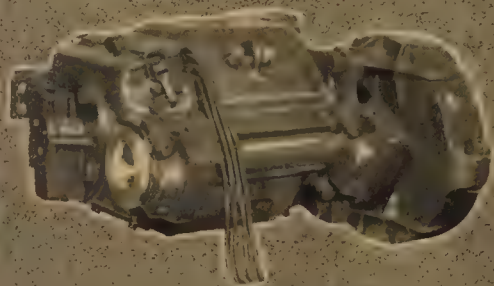
**W**HERE there is a need for a carbody too long for mounting on a rigid-axle single truck—more than 21 feet over the corner posts—and not long enough to make it necessary to carry it on pivotal trucks—less than 28 feet—the Radiax exactly meets the situation. The truck is in operation on forty-three different railway systems, of which number eleven have ordered second lots and three have ordered them a third time.

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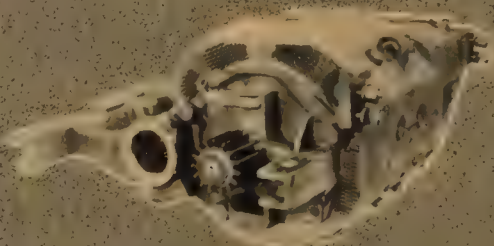
PHILADELPHIA, PA.  
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CLEVELAND, OHIO  
SPRINGFIELD, MASS.



## Look them Over at the Convention



**Light**—See the latest refinements on the G-E 203—first shown at the 1911 Convention.



**Lighter**—Then look at the G-E 247—24" wheel motor.



**Lightest**—And then see the new G-E 258 ball bearing motor.



**Subway**—The G-E 260 195 hp. ventilated motors used in New York.



**Steam Road Electrification**—G-E 253-A three thousand volt motors used on the Chicago, Milwaukee & St. Paul.

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in all large cities



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# ELECTRIC RAILWAY JOURNAL

New York, September 23, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 13 10c a copy

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be Rough or Dainty



It Stands  
Abuse



It Works  
Easily

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lets go when the Passenger takes hold  
and  
takes hold when the Passenger lets go.

**The Curtain Supply Co.**

CHICAGO  
NEW YORK





## Approved

“JOE,” said the General Manager to the Superintendent, “the President has approved all our plans for 1917. We get 50 new city cars and 10 interurbans. There is no question at all about our interurbans; we just want to duplicate our 36-ton cars and Westinghouse No. 548, 95 horsepower motors with HL Control. For the city cars, I think we ought to go to the low wheels. Everybody seems to be adopting them, so they must be OK.”

“I want you to study this question when you go East to the Convention. It may be that we could use 15 or 20 one-man cars on our branch lines, as well as during our light midday traffic.”

“That’s fine, Boss,” answered Joe. “The Westinghouse Company made another big contribution to the art when they developed the original 24-inch wheel motor and later introduced the WEE motor. It looks like Westinghouse No. 514, 40 horsepower motors for 35 of the big city cars with lightweight HL train control, and the No. 506, 25 horsepower motors for the one-manners.”

“That sounds all right, Joe,” said the General Manager. “We will look over these outfits at the Atlantic City Convention.”

### Westinghouse Electric & Manufacturing Company

Sales Offices in All  
Large American Cities



East Pittsburgh,  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 13

NEW YORK, SEPTEMBER 23, 1916

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At a cost of \$1,500,000, an interurban terminal was constructed having an area of 54,000 sq. ft., with spacious waiting rooms and all the modern conveniences to be found in larger cities. (Page 524.)

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### Pneumatic Machines Reduce Size of Tamping Gangs

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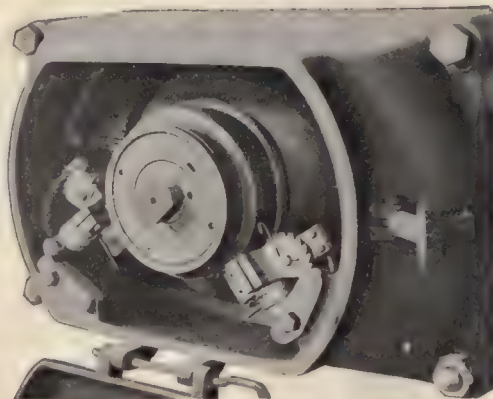
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No back volumes for more than one year, and no back copies for more than three months.

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## "Bungalow" type of Westinghouse Air Compressors



### Brush Holders

—Are permanently located slightly back of neutral position, the most efficient one, since armature rotates in one direction only.

—Are located in lower quadrants, making accessibility easy from the pit. Brushes and holders tend to keep themselves clean.

—Are fastened to motor case with one tap screw and one dowel pin, making removal exceptionally easy.

### Brush Holder Springs

—Are a combination coil and flat spring, which gives double amplitude, takes care of very small vibrations, eliminates chattering, and improves commutation.

—May be given any tension desired by moving the wire lever on the notched dial.

—Provides resting place for flat end of spring while brushes are being taken out.

—Are adjusted without removing and without use of tools.



*Westinghouse Apparatus includes Westinghouse Service*

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**General Offices: Wilmerding, Pa.**

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Westinghouse Building

CHICAGO:  
Railway Exchange Building



NEW YORK:  
City Investing Building

ST. LOUIS:  
Boatmen's Bank Building



# Westinghouse

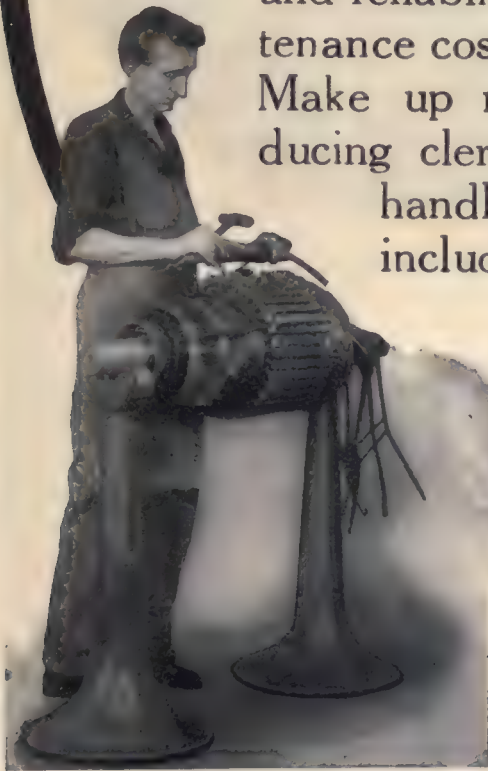
## Repair Parts

THE quality of Westinghouse Railway Motor Repair Parts and Material is more than skin deep.

Tools and facilities for making these parts are expensive.—When made in an inferior manner quality suffers.

Repair parts of inferior quality reduce continuity and reliability of operation and increase maintenance cost.

Make up monthly requisitions, thereby reducing clerical labor, freight, haulage and handling, on all railway repair parts, including armature coils, brush holders, insulating cloth and tapes, fuller board, bearing metal, etc.



# W

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ELECTRIC

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Columbus, Ohio  
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Detroit, Mich.  
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Memphis, Tenn.  
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Minneapolis, Minn.  
New Orleans, La.

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Rochester, N. Y.  
St. Louis, Mo.

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San Francisco, Cal.  
Seattle, Wash.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
W. E. & M. Co.  
of Texas.



## A circular, sepia-toned photograph capturing a bustling street scene. In the background, a large, multi-story building with many windows serves as the backdrop. A prominent sign is displayed across the front of the building, reading: "GRAND SALE OF THE HOUSEHOLD GOODS &amp; FURNITURE SATURDAY AFTERNOON AUG 9". The street is filled with people, some walking and others standing. Several early 20th-century automobiles are visible, including a dark car on the left and a lighter-colored car on the right. In the foreground, two men are walking towards the camera, and a horse-drawn carriage is partially visible on the right. The overall atmosphere is one of a busy, crowded day in a city.

# Bridgeport Brass Company

Bridgeport : : : : : Connecticut





(Patented)

## Easy on the Overhead

O-B Trolley Bases maintain a uniform tension on the wire at all heights. At no time is there undue strain on the overhead—at all times there is sufficient pressure to hold the wheel tightly to the wire.

The O-B Base is equipped throughout with renewable bushings. These bushings take most of the wear and when they are replaced the whole base is rejuvenated.

Send for full details about the O-B Base and our trial offer.

Listed in Catalog No. 16.

**The Ohio Brass Company**  
**MANSFIELD, OHIO**





## *It's Coming to You Next Week*

Be sure it comes  
straight to your desk

With the September 30 issue of the regular weekly number, every subscriber to Electric Railway Journal will receive a copy of the

## **Annual Convention Number for 1916**

It is full of fresh ideas, information, inspiration and data for every man interested in the electric railway business.

Whether you are a general executive, or in charge of a specialized department, you will find a fund of information in this issue which you will not only want to digest carefully, but which you will find valuable for reference for a long time to come.

It is the latest and most complete text book in existence on the Development of the Electric Railway Car and the relation of such development to all departments of electric railway operation.

It is the product of months of study, research and painstaking, accurate, compiling of facts, car-history and data by the editorial staff of the Journal.

To the electric railway official who studies to improve transportation methods this issue is of enormous value.

And not the least interesting and valuable part of it is the advertising section—complete, definite—filled with new ideas and suggestions from practically every responsible manufacturer and supply house in the industry.

Read it—keep it—refer to it. It's *valuable*.

## **Electric Railway Journal**

**239 West 39th Street**

**New York**



# It does not Splash Water



Most prominent among the important features of the solenoid-controlled switch has been the splashing upon pedestrians of muddy water when the point is shifted.

This difficulty has been absolutely eliminated by the

## Non-Splashing Electric Track Switch

The results of service tests on electric railways during the past season have proved most satisfactory in every respect.

The other important new features of this switch are: The switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

*Write us for full details.*

### United States Electric Signal Company

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Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.





## Jim Knew That *Northern White Cedar Poles* Stand Against the Storm

"Jim," said the electrical engineer to the foreman, as they listened to the sixty-mile gale howling outside, "I'm afraid we're in for a lot of trouble. That's a mighty stiff wind; there's tons of sleet on the wires and all our poles are carrying big loads without that ice. Looks to me as if we're apt to have lines down all along the line before this storm breaks."

"Don't worry, Boss," said Jim. "Our poles will all be standing up straight as ram-rods when this wind quits. I set most of those poles and I know what they are. They're all good, straight Northern White Cedar. They've bucked many a stiff wind before and they'll do it this time."

"I never worry about Northern White Cedar poles, no matter how hard the wind blows. I can build a line with Northern White Cedar that'll beat any kind of new-fangled factory-made pole or any of this cheap wood stuff that they try to palm off sometimes as cedar. I always think I've done a good job after I've put a line of Northern White Cedar poles in the ground."

Jim is right. Northern White Cedar poles insure a line of long service, and minimum costs, either for construction or maintenance.

Northern White Cedar is the wood that offers great resistance to decay. It stands up for years under the hardest usage; it is light weight and easily transported; it is a non-conductor of electricity, therefore a safe pole for workmen; it is easily climbed. It makes a straight, symmetrical line.

The supply of Northern White Cedar is ample for generations to come.

*For further information write*

**Northern White Cedar Association**  
Lumber Exchange  
Minneapolis, Minnesota





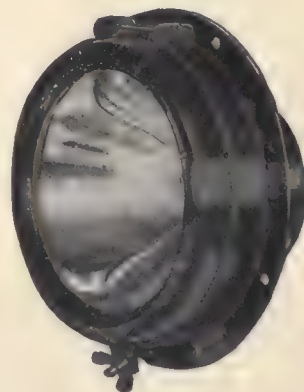


## *Produced Only by the Famous "Golden Glow" Mirror Reflectors*

"Golden Glow," the name behind these famous headlights, stands for a powerful beam of golden-yellow light. A light which will wonderfully penetrate fog, and, because the blue and violet rays are absorbed by the reflector, is non-blinding.

This "Golden Glow" light can be produced only by the "Golden Glow" Reflector, which is made from special glass, scientifically mixed and of a certain greenish-yellow color. Furthermore, "Golden Glow" Reflectors are ground and polished to a true parabola by special patented machinery, and cannot be duplicated.

Insist on "Golden Glow" Headlights and you'll get double efficiency at less cost for operation.



Type SR-95



Type SE-95

*There Is No Other  
"Golden Glow" Ref-  
lector—Our Patented  
Process Fixes That*



Type SMG-95

*Have us demonstrate them on your cars.*

### **ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

NEW YORK  
50 Church Street

CHICAGO  
Monadnock Bldg.



# ONE MAN

can straighten a pole in a  
few minutes with a  
No. 318

## SIMPLEX POLE JACK

and do it easily, without straining his  
back or digging around the pole.

Note the simple process in straighten-  
ing a pole with a Simplex Jack.

(1) The I-beam is dropped on the ground  
a short distance from the pole. The Jack is  
placed thereon and leaned against the pole  
at an angle of about 45°. (The Jack "pivots  
on its base.")

(2) With the bar in one of the two sockets,  
the pole is forced back a notch at a time  
into the exact position desired.

(3) When straight the bar is removed and  
used to tamp, while the Jack holds the pole  
in place. No hurry. (If the whistle blows  
go to dinner.) No pike poles. No block and  
tackle. No digging. No climbing. No  
straining.

*Send for complete  
Catalog of Simplex Jacks*

TEMPLETON,  
KENLY & CO.,  
LIMITED

*Established 1899*

1022 So. Central Ave.,  
Chicago, Ill.

2 and 3 Norfolk St.,  
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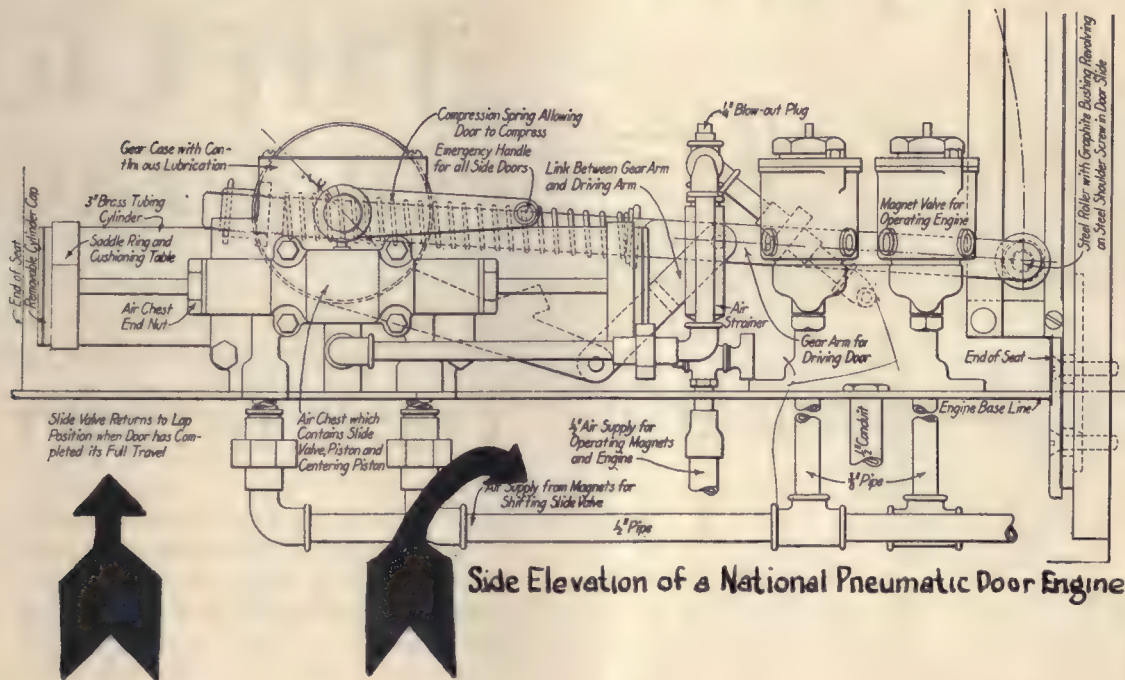
GOLD MEDAL  
for the SAFETY  
of JACKS Award-  
ed by the Inter-  
national Society  
of Safety and San-  
itation and the  
American Museum  
of Natural History,  
1913.





# NATIONAL PNEUMATIC DOOR AND STEP CONTROL

## Will Not Overload Your Present Compressors



Any compressor equipment that is working within reasonable limits can readily supply the trifling extra amount of air required by the engines of National Pneumatic Door and Step Control.

The real strain on the compressor comes not from the actual service needs, but from leakage losses.

That's why National Pneumatic

engines have a slide valve which cuts off the air supply from the main reservoir when the door is entirely opened or closed.

The use of National Pneumatic Control on **storage air brake** cars in Detroit is surely practical proof of low air consumption, isn't it?

A trial equipment is at your disposal for further proof.

# NATIONAL PNEUMATIC COMPANY

50 Church St. New York



515 Laflin St. Chicago



# Track Grinding should be done RIGHT *or not at all*



## A Reciprocating Track Grinder

in the hands of the most unskilled operator produces a perfectly smooth rail or joint. You get it the first time, not the *nth* time. You get it without wasting an unnecessary particle of the rail.

If your present method of grinding involves skilled labor you are wasting money in wages.

If it does not give an absolutely smooth rail or joint you have not removed the tendency of the trouble to recur. Corrugation multiplies like sin, and the wages of sin come high.

If your method does not give an exact result the first time it means more frequent grinding, a padding of the payroll at the expense of the method.

If your method is wasting the rail unnecessarily it means you'll have to float that bond issue so much the sooner to make replacements.

So you see it's better not to grind at all if you don't grind right. Sometimes rule-of-thumb methods of grinding give fair results—but at what price?

The Reciprocating Track Grinder always gives satisfactory results. Excellent results mechanically and absolute results economically.

We'll ship you a machine on request. You can pay for it when you are convinced that it will pay for itself.

### Railway Track-work Company

30th and Walnut Sts., Philadelphia



# *A Trip Through the Foundry where Davis Steel Wheels Are Made*



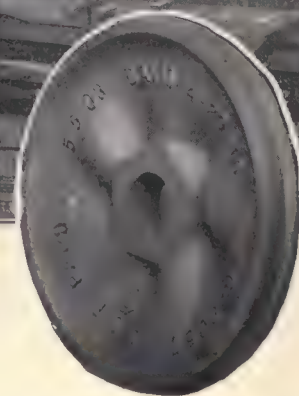
Steel casting in general offers little novelty for the average mechanically inclined man. Methods are simple—developments slow.

But the production of a Davis Steel Wheel is an entirely different matter. It is a specialized process with departures which you have probably never heard of—little details and big ideas that make the casting of Davis Steel Wheels an industry apart from that of ordinary steel casting.

The plant of the American Steel Foundries at Granite City, Illinois, one of the largest of its kind in the world, reflects in every way the spirit of modern manufacturing—efficient and economical production. Every possible precaution and intelligence is used to produce a safe, serviceable wheel.

Step by step we are going to guide you through this enormous plant and explain to you the vital features in the making of a Davis Steel Wheel. You will then be able to follow the logic back of our claims and see that they are well founded.

Watch for these advertisements in every other issue. You will find them not only interesting but instructive. Read them carefully.



## DAVIS Steel Wheels

The steel wheel with the one wear tread.

No slid-flats—no turning—no trouble with motor clearances.

A hard, tough manganese tread and flange.

A soft, ductile steel plate and hub.

20% saving in weight.

Minimum maintenance cost.

Strength — safety — Economy.

The steel wheel backed by years of successful service.

You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A. E. R. A. specifications and your service requirements.

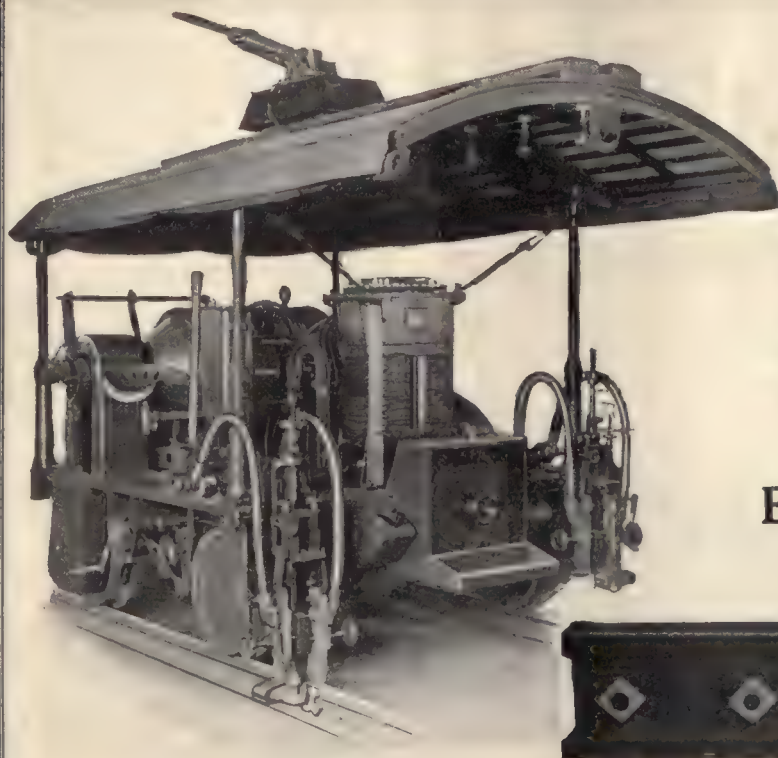
Quick delivery assured. Write.

# American Steel Foundries

1100 McCORMICK BUILDING

CHICAGO





## Here's the Bond That Gives—

full 8 to 1 contact area. The car welds the whole side of the terminal to the rail. Don't be satisfied with less.

## Electric Weld Rail Bonds



## The Electric Railway Improvement Co.

Cleveland, Ohio

## EFFICIENCY — RELIABILITY — SIMPLICITY

### Allis-Chalmers Parsons Steam Turbines

#### District Offices

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Cleveland, Ohio.  
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Duluth, Minn.  
El Paso, Tex.  
Indianapolis, Ind.  
Kansas City, Mo.  
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Los Angeles, Cal.  
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Salt Lake City, Utah.  
San Francisco, Calif.  
Santiago, Chile  
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Seattle, Wash.  
Toledo, Ohio.

Show sustained economy after years of operation  
Units built in sizes from 200 K.W. up



3200 KW., Max. 3600 R.P.M., H. P. Condensing Steam Turbine and Alternator.  
Unit of this size installed in the plant of the Eastern Pennsylvania Ry. Co., Palo Alto, Pa.

## Allis-Chalmers Manufacturing Co.

Milwaukee, Wis.

For all Canadian Business refer to Canadian Allis-Chalmers, Ltd., Toronto, Ont., Canada



# "Send 209 More"

Now the United Railways of St. Louis have

# 1419

## PETER SMITH FORCED VENTILATION HOT AIR CAR HEATERS



Every time they ordered they had in mind two points—efficiency and economy.

They knew that each heater would deliver 275 cubic feet of warm air—fresh air—every minute, at an operating cost of 28 cents per day.

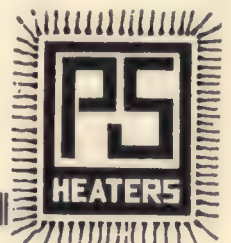
Furthermore, the Peter Smith Heater is the lowest in maintenance cost, installation cost and removal cost. The ventilating fan can be operated in summer as well as winter.

Don't you think it would pay you to look into this method of heating your cars? Data and blueprints on request.

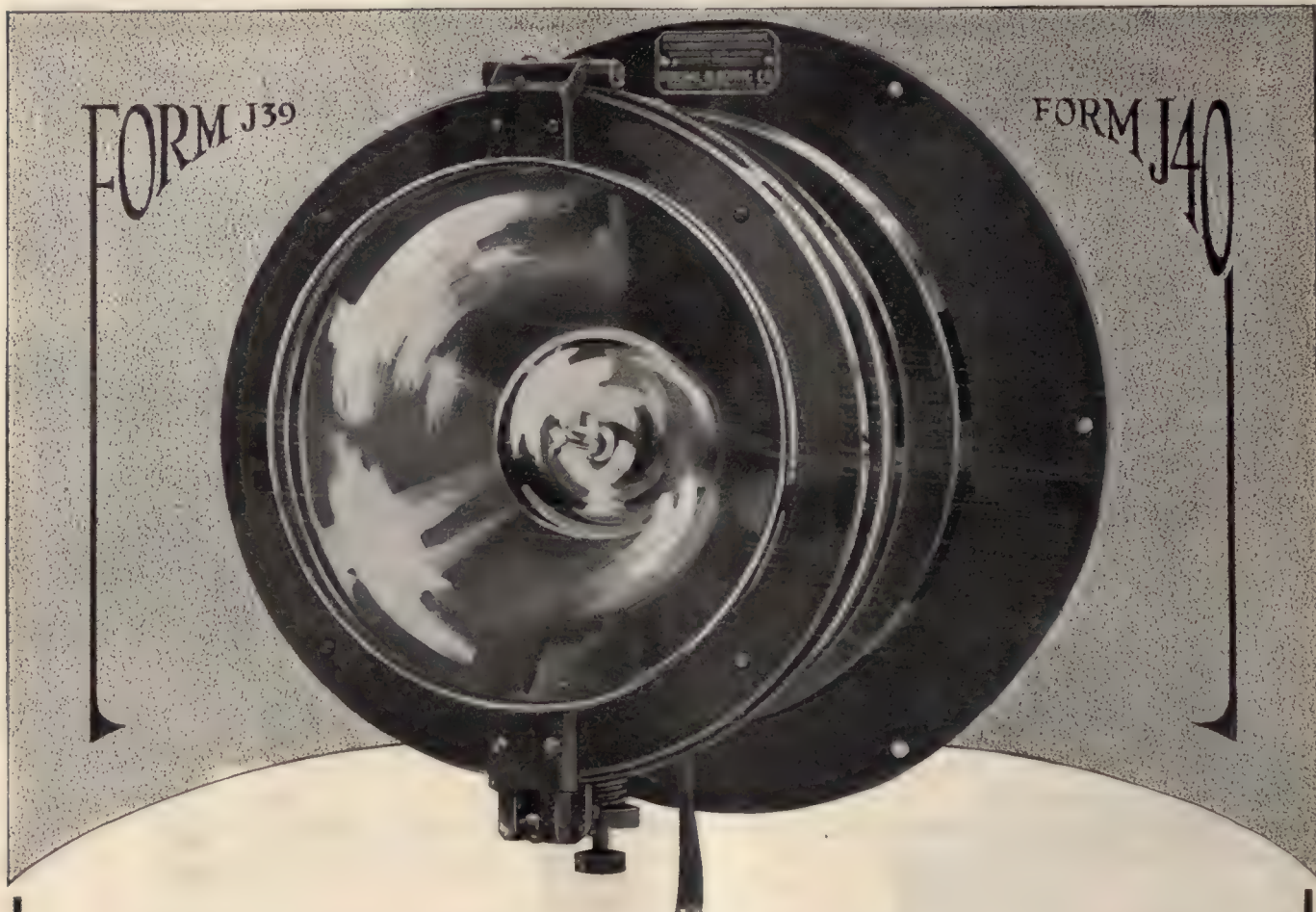
**The Peter Smith Heater Co.**

Detroit, Mich.

*Heater Specialists for Thirty-five Years*







## Less Weight

Reduce the weight of your street railway equipment; meet the demand for higher operating efficiency by installing these light-weight headlights on your city and suburban service.

Form J 39 is bolted to the dash

Form J 40 is recessed in the dash

They are both made of rolled steel instead of cast iron.

The mirror reflector together with our patented focusing mechanism insures a "safety first" beam for your motorman.

Write our nearest office for further information on these light-weight headlights.

# General Electric Company

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Rochester, N. Y.

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Toledo, Ohio  
Washington, D. C.  
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For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso,  
Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, SEPTEMBER 23, 1916

No. 13

## SINKING FUND ACCOUNTING

Although electric railway sinking funds are not so prevalent as in those days when rapidly recurring obsolescence almost placed railways in the category of "wasting-asset" companies, quite a number are still used in connection with existing mortgages. In handling them, railway accountants have often been confronted with fine problems, not all of which seem to have been solved to the satisfaction of every one. For this reason, special interest should attach to the article by W. H. Forse, Jr., published elsewhere in this issue, which contains valuable notes on the proper accounting treatment of various points and is in the main an example of that interpretative thinking which characterizes the modern accountant. Much of the confusion in regard to sinking fund accounting, we suspect, arises from the lack of understanding of its basic theory and also from a sometimes lazy and a sometimes wilful carelessness in the use of accounting terms. If some men know the difference between sinking funds and sinking fund reserves—that sinking fund accounting affects only the real or asset and liability accounts, while sinking fund reserve accounting concerns only the surplus account and appropriations therefrom—it often is not evident from their words. This should not be, for no railway accountant should fail to do all in his power to help place utility accounting on an exact and scientific basis.

## BEST WISHES TO THE BOSTON ELEVATED

The change in the presidency of the Boston Elevated Railway, announced elsewhere in this issue, comes at a time when the company is facing one of the greatest crises in its history. It is reason for congratulation that the road is to retain the able services of its former chief executive as chairman of the board of directors while placing its immediate administration in the hands of one of the most brilliant executives and exponents of the "square deal" among the younger men which the electric railway industry has produced. Engineers, too, must feel gratified that another of their own profession has been found worthy to fill so important a place in the transportation field as the presidency of the Boston system. The administration of the Boston Elevated has always called for the broadest cooperation among the small group of men to which the direction of its affairs has been committed. The devotion of these men to the best interests of the railway for years has been marked by a willingness of individuals to seek results first and to let personal fame take care of itself. The combined talents of the organization will be needed as perhaps never before in the forthcoming difficult task of securing an adequate return for the

services rendered the public. The best wishes of the industry and of this journal go to Chairman Bancroft and President Brush as each takes up the duties of his new office.

## VIOLENCE IN NEW YORK STRIKE

During the past week there has been an increase in the number and virulence of the attacks by strikers and their sympathizers on electric cars operating in New York. Citizens who are exercising their right to ride on the cars are being made the target of stones and other missiles, and serious injuries have resulted. These outrages mark the disappointment and desperation of the strikers in their failing cause. The responsibility of this lawlessness is directly upon the leaders of the strikers. Whether they have openly advocated assaults on the cars may be open to question, but we have seen no evidences of active measures on their part to stop these outrages. The willingness to accept such benefits as they think will result from these assaults makes the strike leaders participators in them in fact even if not under the law. We do not believe, however, that the New York police will permit the establishment of any reign of terror in this city. The sentiment of the city, the precedents in the case of previous outbreaks and the performance of the authorities in this particular contest, all indicate that disorder will not be tolerated. The physical difficulties of preventing sporadic cases of attack or of apprehending the perpetrators when such an attack is made, we admit, are great. Nevertheless the police department of New York has had for many years the reputation of being "the finest" that we believe it is equal to the task. The announced decision of the district attorney to seek indictment for assaults on cars under Section 1991 of the Penal Code which provides penitentiary sentences of from five to twenty years on conviction may also act as a deterrent.

## KEEPING STOCKHOLDERS INFORMED

A noteworthy example of the special reports that might be issued to enlighten stockholders on matters affecting their company, is the one recently sent out by the United Railways of St. Louis, as noted elsewhere in this issue. Feeling that the stockholders were especially interested in the condition of the property after the payment of the \$1,839,205 of mill tax judgments, the management decided that it was an opportune time not only to explain this point but also to outline the important problems now confronting the company. Consequently a special report was issued for the first six months of 1916, as elaborately constructed



as the regular annual report and presenting in detail the position of the company concerning its power supply, taxes, franchises, maturing securities and future construction needs. We cannot emphasize too much the desirability of such reports. It is customary, of course, to issue special notices to stockholders about reorganizations or changes in corporate affiliations, and certain progressive companies issue monthly or quarterly financial statements, but special reports could be used more extensively to explain to stockholders unusual expenditures, unexpected operating conditions, the settlement of long pending questions and changes in company policy. One of the four major methods of establishing good public relations, as we stated in the outline on this subject in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2, is to have a clean internal financial history, in the securing of which special reports to stockholders constitute a material and most important help. The question of the cost of such reports will be raised, but in this connection it will be well to bear in mind that in public relations work a penny-wise policy can very easily be carried to a disastrous extreme. An important feature of the St. Louis report is the data on the power situation of the company, on which there has been some public discussion. An abstract of this part of the report, giving the rates paid for hydraulic and steam power and the future "power" policy of the company, is published on pages 531 and 532.

#### **"REINFORCED STEEL MAGNET" FOR DALLAS, TEX.**

The new interurban terminal in Dallas, Tex., which was opened to the public this month, not only provides excellent traffic accommodations for the four lines entering Dallas, but it has also gone a long way in fostering the good will of the community which it serves. The terminal is an eight-story modern office building with a spacious waiting room on the main floor and the terminal tracks at the rear. In the construction of the building 90 per cent of the contracts were given to local concerns, and at the opening reception a large sign referred to the building as a huge reinforced steel magnet which would attract millions of visitors to Dallas each year. The fact that these interurban lines carry 6,000,000 passengers annually and that only 35 per cent of these make local trips shows that the railway company's prediction is within reason. Thus it was particularly emphasized that the prosperity of the city and that of the interurban lines go hand in hand, and that the new enterprise, by stimulating travel to Dallas, will increase the local trade and boost the "Buy It in Dallas" movement. As a means of further advertising the interurban lines, the railway officials had moving pictures taken of the throngs that crowded the building on the opening day. These pictures will be shown in one of the leading Dallas theaters and in many other cities of Texas.

The terminal, including land, building and tracks, cost about \$1,500,000. It thus belongs in the class of expensive electric railway terminals such as have been built at Newark, N. J.; Milwaukee, Indianapolis, Denver, Los Angeles, Cal.; Oklahoma City, and Vancouver,

Can. There are other and less expensive terminals also in smaller cities. The building of such terminals indicates that the railways consider it a paying investment to have themselves represented by buildings which appeal to the civic pride of their communities as well as increase the railway facilities. By the use of such a terminal station instead of the plan of looping the interurban tracks through the city, the public is provided with an attractive waiting quarters with comfortable rest rooms and other conveniences; a common transfer point is obtained, and the railway has much better facilities for selling tickets and handling traffic.

#### **COMPANY SECTION EXHIBIT AT THE CONVENTION**

The American Association committee on company sections and individual membership is planning what should be a very instructive and attractive feature of the convention. The sections have been asked to demonstrate their work by means of exhibits, and the results of their efforts will be viewed with interest not only by the representatives of companies which already have sections but, it is hoped, especially by those which have not. While the section movement is still in its infancy, the sections are numerous enough to make a creditable showing. By so doing, they will help tremendously in stimulating interest in the movement and they will reflect credit upon their companies and themselves. Tangibility is important in any line of work, for as long as claims as to benefits are nebulous and general they do not carry much weight. Visible testimony is convincing and compels attention.

It is true that this particular kind of work does not lend itself readily to illustration, but that it can be illustrated in unique and attention-compelling ways can readily be demonstrated. The main thing is for the most ingenious person or persons available in each section to concentrate attention on the matter at once, calling in the assistance of the publicity department of the company if necessary, so that ideas of such originality will be generated that they will in turn produce the enthusiasm necessary for a live exhibit.

Without venturing to suggest in detail how the exhibits can be made most effective, one or more of the following items should certainly be included in each: Neatly lettered charts on a fairly large scale could be used to show the growth of the section, the proportion of available men enrolled, the subdivision of the membership among the departments of the company and other statistics which lend themselves to graphical presentation. First-class photographs, preferably framed uniformly, illustrating social events, "stunts," dramatic performances, groups of officers and of members at meetings, etc., would be particularly effective. Enlargements would be best for this purpose as the pictures must be viewed from some distance. Manuscripts of papers rendered at meetings could be arranged for ready inspection, and they would be most attractive if inclosed in soft leather or cloth covers. Samples of advertising matter used in announcing section events would be excellent material for the exhibit because these were necessarily designed to attract attention. Collections



of clippings from newspapers and technical journals should also be effective as showing the impression made by the section upon the community and the outside world. The value of getting such an exhibit as this together is twofold: In the first place it serves the general publicity purposes outlined above, and, second, it forces the section to review its own activities carefully and thus cannot but stimulate to further effort.

#### ARE ELECTRIC RAILWAY ENGINEERS SUPERFICIAL?

The members of the American Electric Railway Association and its affiliated associations have now in their hands a large amount of text of reports which are to be presented at the Atlantic City convention. Among these, the reports of the Engineering Association committees are conspicuous not only on account of the bulk of the pamphlets containing the preprints, but because they show an enormous amount of detail work in collecting data and arranging them for convenient reference. All of these reports will be fully covered in the report issue of the *ELECTRIC RAILWAY JOURNAL*, that of Oct. 14, wherein the reports will be abstracted at length and an editorial study of their contents will be presented. In the intervening three weeks, however, serious study will be given to all of the reports, but those of the Engineering Association will require the most effort on account of their wide scope and the large number of pages of text which they comprise.

Take for example the reports of the committees on power generation and distribution which together contain more than 100 pages of text, mostly data and specifications. Some study will obviously be required to master the contents of these reports. When one considers the attention given to 100 pages of text in an engineering college course of study, he realizes that a superficial examination of these reports will neither prepare him to participate in the discussion at Atlantic City nor intelligently to read the abstracts of the discussion in the report issue of the *ELECTRIC RAILWAY JOURNAL*. Take for more detailed examples the tables of data on rotary converters and their transformers, the tables of operating and cost data on power generation, the elaborate statistics on third-rail construction, the specifications for overhead line material, the treatise on concrete pole design, and other such material. While the reports on power generation and distribution have been cited as examples, exactly the same remarks can be applied to the report on way matters, that on equipment and several others.

There are two ways of appropriating the results of the work necessary in getting together such data as are contained in these reports. One may say "That's fine stuff; I shall file it for reference and look it up when I need it"; or he can treat the text as a lesson assigned to him for study by the industry, and on which he will be expected to recite either at the convention or when the first problem requiring the use of the data arises. Foreign engineers say that American engineers are superficial, that we do not study deeply into the problems which we attack. There is a good chance between the present date and that of the convention to

demonstrate that this is not so, at least as far as electric railway engineers are concerned.

#### NEW YORK'S LUCKY STAR

For many years New York City has been lucky in that its local transportation affairs have not been dominated by any irresponsible outside labor influences, but many citizens in the hustle and bustle of metropolitan life have failed fully to realize this fact. If they do not do so now, however, after the strike events of the last two weeks in the city, they are dead to the meaning of current events. The repudiation of the settlement plan of Aug. 7 by the union employees of the Third Avenue Railway and the Second Avenue Railroad, characterized by Mayor Mitchel and Chairman Straus of the Public Service Commission as an act without justification, shows in all probability what would have been the future attitude of the union men and leaders toward the "sacredness" of the settlement plan had it remained in force.

It is well for the city, therefore, that the exposé has come at this early date, and now we hope the public will better understand why the railways, none of which was opposed to collective bargaining of its employees directly with the management, refused recognition of the Amalgamated Association; why practically all of the Interborough Rapid Transit employees saw fit to maintain their own union in spite of the attempted proselyting of the Amalgamated Association; why they remained peaceably at work, while the misguided employees of other lines, completely unconcerned, violated their peace agreements solely for the profit of the Amalgamated Association, and why the proposal of a general sympathetic strike has up to this time been so coldly received by labor leaders in general.

As a matter of fact, we believe that the public is in a better position to understand such things than it was a short time ago. The hold-up of Congress by the four steam railroad brotherhoods, the contemptuous disregard of the settlement agreements in New York and the palpable efforts to obtain through the assistance of public officials what neither justice nor equity would countenance—all these indicate too clearly the habitual weapons of a certain type of unionist in whose good faith it would be folly to place much trust. Nor has the threat of a general sympathetic strike in New York City served any other purpose than to show to the citizens of the city how far their convenience would be sacrificed to bolster up a deservedly losing cause.

It is indeed fortunate for New York that the Interborough Rapid Transit Company, knowing the character of the unionists with whom it would have to deal, avoided all the evils that would have resulted therefrom and assured a more amicable and a more nearly permanent peace to its employees and itself by encouraging the men to form their own internal brotherhood. Fortunate, too, is it that the unions on the surface lines saw fit to throw down the gauntlet as a result, for that course has without doubt secured for New York freedom from the unbridled domination of an outside transportation union for many years to come.





SEVEN THROUGH TRACKS SWINGING INTO TERMINAL YARD. VIEW TAKEN FROM POSITION A ON TRACK LAYOUT



SEVEN THROUGH TRACKS LEAVING TERMINAL YARD. VIEW TAKEN FROM POSITION B ON TRACK LAYOUT

Eight-Story Interurban Terminal Building and Tracks in Dallas, Tex.



# Dallas Railway Completes Seven-Track Interurban Terminal

By EDWARD T. MOORE

Local Manager Dallas Street Railway and Lighting Properties

**W**HILE it is not the largest, either in height or track capacity, the recently completed interurban terminal in Dallas, Tex., is one of the most perfect structures of its kind in America to-day. The builders have endeavored to combine the best features of the terminals of Indianapolis, Los Angeles, Columbus, Denver, Milwaukee, Oakland, Springfield, Terre Haute and Hamilton, Ont., and profiting by the experience and mistakes of others, they have succeeded in producing a splendid interurban terminal.

The four interurban lines entering Dallas use this terminal. These lines are the Waco division and the Corsicana division of the Southern Traction Company, the Denison-Sherman division of the Texas Traction Company, and the Fort Worth division of the Northern Texas Traction Company. The aggregate track mileage of these four divisions is 265, and last year the lines carried more than 6,000,000 passengers. Approximately 35 per cent of the passenger traffic on the four divisions mentioned consists of the passengers boarding and alighting from the cars within the

city limits of Dallas. These lines are now managed and operated by the Stone & Webster Management Association, and the terminal was designed and constructed by the allied Engineering Corporation. The ownership of the property, however,

rests nominally with the Dallas Interurban Terminal Association, of which Charles F. W. Wetterer, Fred H. Farnham and the writer, who is manager of the Dallas street railway and lighting properties, are the trustees.

After the financial and franchise arrangements were completed last autumn, the Engineering Corporation on Dec. 11, 1915, began clearing the site for the terminal, and the structure was rapidly rushed to completion. In spite of the many difficulties experienced in securing mate-

rial and supplies, the terminal was finished and formally opened to the public on Sept. 1, four months ahead of the scheduled time. The rapidity with which the building was completed is considered remarkable under the circumstances, and the contractors have thereby established an enviable reputation throughout the Southwest.

The accompanying map shows the location of the ter-

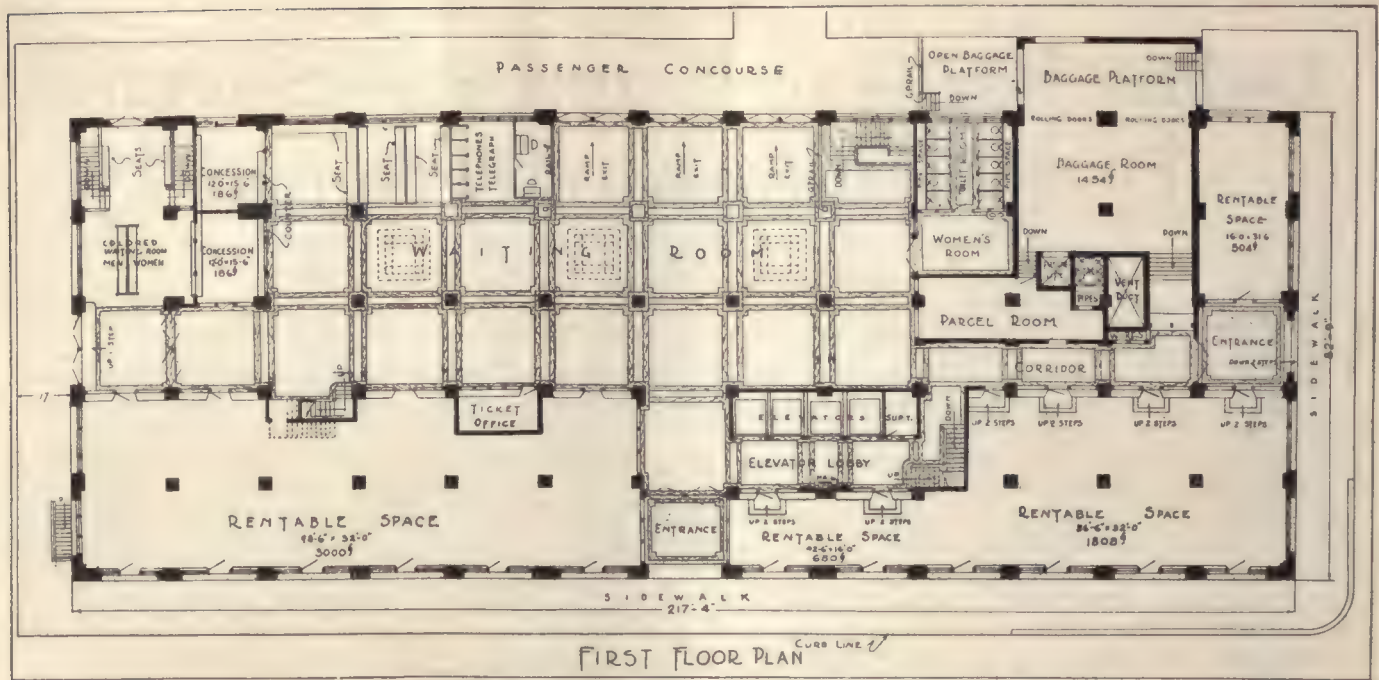
## CHARACTERISTICS OF THE DALLAS TERMINAL

The cost of land, building and tracks was \$1,500,000. The building has eight stories and basement and it is 83 ft. x 217 ft. in size. The area of the terminal site is 54,000 sq. ft., and the areas of the waiting, baggage and parcel rooms are as follows: Waiting room, 6,400 sq. ft.; baggage room, 1,454 sq. ft.; parcel room, 326 sq. ft. There are seven through tracks, which have a capacity of twenty-four cars. Four interurban lines use the terminal, and these have a mileage totaling 265. Some 6,000,000 passengers are carried annually by the interurban lines.



MAIN WAITING ROOM OF DALLAS INTERURBAN TERMINAL BUILDING

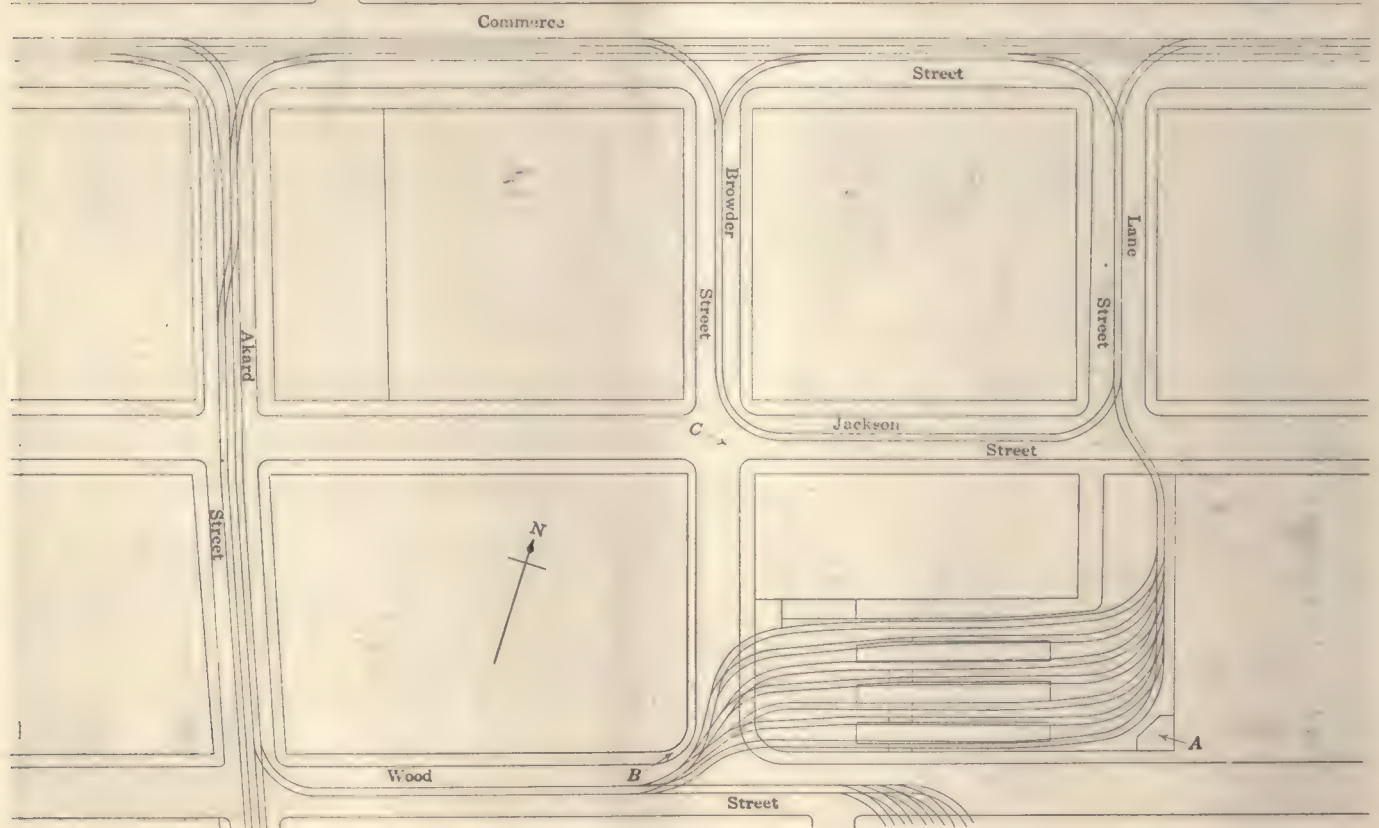




ARCHITECT'S PLAN OF MAIN FLOOR OF DALLAS INTERURBAN TERMINAL BUILDING

minal site, which is a tract of land fronting 284 ft. along Jackson Street east of Browder Street, 189 ft. on Browder Street south of Jackson Street, and 284 ft. on Wood Street east of Browder Street. Upon this site has been erected the eight-story terminal building, fronting 217 ft. on Jackson Street and 83 ft. on Browder Street. East of this main structure and to the south are to be found the network of special work and terminal tracks, while on the southwest corner of the tract is situated a two-story brick and concrete trainmen's house.

The terminal building is monolithic in type, with a reinforced frame, brick curtain walls and terra cotta trim. The architectural style is that of the late Italian Renaissance. Perhaps the most attractive feature of this handsome structure is the commodious waiting room, which is shown in one of the accompanying illustrations. The room is on the main floor, and has an area of 6400 sq. ft. It is well lighted by day through a row of windows along the south side, and by night it is indirectly illuminated through frosted bowls hung from the ceiling. Its terrazzo floors with Tennessee



TRACK LAYOUT OF DALLAS INTERURBAN TERMINAL SHOWING CONNECTIONS WITH TRACKS ON ADJOINING STREETS



gray marble borders, the refreshing combination of gray and green tile in the wainscoting, and the simple beam ceiling, with handsome lighting fixtures, present a most pleasing and harmonious appearance. The ventilation is provided by three motor-driven exhaust fans concealed above the ceiling of the room and by opening a row of windows on the south side.

#### WAITING ROOM CONVENIENCES

The ticket office, centrally located along the north side of the waiting room, was designed with the future development of traffic in mind. There are four windows, one for information, one for regular ticket sales, one for colored patrons, and an extra window for heavy business. Opening from the west end of the waiting room is the women's rest room, where a maid is constantly in attendance. Couches, comfortable chairs and reading matter make it a restful retreat. The baggage room, with an area of 1454 sq. ft., is situated in the southwest corner of the terminal building. The baggage and parcel checking window opens into the main waiting room. As the terminal is strictly a passenger station, all express matter will be handled at some location other than on the terminal property.

East of the main waiting room is a smaller but equally attractive waiting room for the negro patrons. In finish it is similar to the main waiting room, and like it is equipped with large comfortable oak settees. A drug store, the display room of the Dallas Electric Light & Power Company, a restaurant, barber shop, fruit store and newsstand will occupy the rentable area on the main floor, which faces on Jackson and Browder Streets and has auxiliary entrances from the waiting room.

Five passageways make the entrance to and exits from the waiting room simple. One of these is through the display room of the Dallas Electric Light & Power Company at the northwest corner of the building. Another is through a drug store facing on Jackson Street. The third is the main entrance itself on Jackson Street. The fourth is an entrance from Browder Street, and the fifth, which is used principally by colored patrons of the terminal, is on the east side of the building, facing an extension of Lane Street.

Besides using a large space on the main floor for a display room, the Dallas Electric Light & Power Company will have one of the substations and the meter and service departments of the company located in the basement, which was especially designed to accommodate the electrical apparatus. The floors above the waiting room are used exclusively for offices. The second floor is occupied by the general office of the street railway and lighting companies and by the local office of the Stone & Webster Engineering Corporation. The tenants on the other floors include the Southwest General Electric Company, the Texas Power & Light Company, the Texas Traction Company and the Southern Traction Company. Before the building was ready for occupancy over 90 per cent of the office space had been contracted for.

Admirably situated near the heart of the business district, the terminal is an average of 4.7 blocks distant from thirteen of the principal retail stores, six blocks from nine of the principal banks, 8.9 blocks from twenty-three of the principal wholesale houses, 4.7 blocks from nine of the principal theaters, 4.3 blocks from the sixteen other important office buildings, and 3.5 blocks from the largest six hotels.

One of the accompanying illustrations shows the location of the tracks in the terminal region. On leaving Commerce Street at Lane Street, all interurban cars operate over a single track to the terminal property, one block distant. Here the single track fans out into

seven through tracks, located south of the main building and parallel to it. Interurban cars on leaving the terminal run south on Browder Street to Wood Street, west on Wood Street to Akard Street, north on Akard Street to Commerce Street, and thence to their respective destinations. The seven tracks in the terminal have a combined capacity sufficient to accommodate twenty-four interurban cars of the largest type. Except for the seventh track, which is adjacent to Wood Street, the tracks are in pairs separated by concrete concourses. Concrete shelters protect the passengers on the concourses during inclement weather. The seventh track is provided with a pit, where emergency repairs can be made.

The plan is to have only emergency repairs made at the terminal. Across Wood Street and south of the



FRONT VIEW OF DALLAS INTERURBAN TERMINAL BUILDING  
TAKEN FROM POSITION C ON TRACK LAYOUT

terminal property is a tract 82 ft. x 151 ft. on which storage tracks are to be laid to accommodate about eighteen additional cars. All of the special work is of 127-lb. Lorain Steel Company section No. 397 rail. The connecting rails in the streets are 103-lb. Lorain Steel Company section No. 478, while the tracks on the terminal property and the storage tracks are of 80-lb. A.S.C.E. rail.

On the southwest corner of the terminal property a two-story brick and concrete trainmen's house has been erected. On the first floor of the building supplies for the car cleaners and repair men are kept. The upper floor is used for trainmen's quarters, and is provided with shower baths, lockers and game tables.

Beginning on Oct. 2, Dr. Samuel Sheldon will give, on Monday evenings, a series of thirty lectures and recitations on electric traction and transmission at the Brooklyn (N. Y.) Polytechnic Institute in connection with the evening technical courses.



# How to Use Sinking Funds

Sinking Funds Not Set Aside So Much Now, But Under Existing Mortgages Providing for Them Perplexing Problems Arise—Author Describes Proper Accounting Treatment

By W. H. FORSE, JR., C. P. A.

Secretary-Treasurer Union Traction Company of Indiana, Anderson, Ind.

THE sinking fund requirement is a common-sense safeguard which is to be expected in cases where the security behind the mortgage is a diminishing quantity or one subject to violent fluctuation. For example, a bond issue put out by a manufacturing corporation may contain a sinking fund provision because of the more or less unstable character of the business. The process may be one which is subject to the white heat of competition, such as is found in the rapidly changing automobile industry, or it may be an undertaking that is liable to be revolutionized in a day by new scientific discoveries, inventions or tariff changes. In all of these cases adequate sums should be set aside to fund investment or debt as the oils, minerals, timber or other assets are sold, or when abnormal profits are being earned as the result of temporary extraordinary conditions.

## SINKING FUNDS NOT NOW USED SO MUCH IN THE RAILWAY FIELD

When the electric railway industry was young, it was common to require sinking funds. The motive power had, within a comparatively short period, been changed from animal traction to underground cables, and then to the crude electric railway motors of a generation ago. Bankers naturally expected other revolutionary changes, and as a matter of precaution required that sinking funds be written into the early mortgages in order that the debt might be reduced before the dread specter of "obsolescence" appeared.

How different are the conditions in 1916! Electricity is operating cars over 40,000 miles of city streets and interurban railways in the United States alone, and conservative steam railway operators have adopted this form of energy for hauling heavy trains over the Rockies, for ridding great city terminals and tunnels of smoke, and for furnishing commuters with frequent, rapid suburban service. The electric railway industry has become so well established that it is now considered better practice to omit sinking fund requirements from mortgages unless there are peculiar local conditions, not common to the industry as a whole, which must be taken into consideration.

The sinking fund ordinarily used provides that sums must be set aside annually or at other periodical intervals to retire debt or investment. The modern electric railway in a growing community, however, can generally find better use for its surplus earnings in making the extensions and improvements demanded by the public and regulatory bodies. Improvements cannot always be financed out of earnings, and additional bonds must frequently be issued. In fact, the rapid growth of American cities has in the last decade required millions of dollars of increased capital to be invested in betterments and additions to existing electric railways. In the face of such facts, it would hardly be worth while for an electric railway to set aside \$100,000 to meet a sinking fund requirement for the retirement of bonds in one year, and in the same or following year issue \$200,000 worth of bonds to finance extensions and improvements to the railway property.

Moreover, bonds containing sinking fund provisions

are not attractive to the investor if the mortgage provides that they can be "called" by serial numbers, because the investor buying a long-term security does not care to face the possibility of being required to reinvest at a time when conditions may be unfavorable. Furthermore, if bonds retired through the sinking fund are to be purchased in open market, the company may be required to pay a premium and thus be penalized for retiring evidences of debt highly esteemed by the holders. This is a "tax" which is undesirable, to say the least.

## SINKING-FUND PAYMENTS NOT CHARGES AGAINST CURRENT INCOME

Sinking funds are still found in the electric railway field, however, and the accountant is at times required to solve perplexing problems relating to them. There is considerable misapprehension concerning the proper treatment of sinking funds, and many business men otherwise well informed have the impression that they are properly chargeable against the income account. This opinion has prevailed in some quarters because it so frequently happens that sinking fund installments are paid out of gross income. The regularity of the payments and the fact that there is often no other source than current income for obtaining such moneys have resulted in an incorrect grouping, in some cases, of sinking fund payments with interest, taxes and other fixed charges. It is apparent, however, that sinking fund payments for retirement of funded debt or investment merely change the form of assets and liabilities and do not affect the income account.

Montgomery in his work entitled "Auditing—Theory and Practice" says: "Sinking fund requirements to retire bonds, etc., must not be confused with depreciation allowances," and "sinking fund installments are capital expenditures, and do not properly appear among operating expenses, but should be stated as deductions from net profits when ascertained." In the case of the Winnipeg (Man.) Hydro-Electric Company the by-laws and charter provided that the annual interest and sinking fund payments should be made out of the "revenues" of the utility, but Judge Robson of the Manitoba Public Utilities Commission called attention to the fact that the sinking fund payments constituted a repayment of capital investment and must be accounted for through capital account. Sinking funds, in short, are means for retiring capital obligations, and while mortgages may in some cases provide that the installments thereof shall be paid out of net income, it does not necessarily follow that the mortgagor must show by his accounts that such sinking funds have been charged against income.

The fictitious "Northern Interurban Railway," let it be supposed, has a property mortgaged for \$20,000,000, and an annual sinking fund requirement of \$100,000, to be used in retiring mortgage bonds. In 1916 its net income or surplus for the year amounts to but \$50,000 before making provision for the sinking fund. If it has \$2,000,000 cash in its treasury and applies \$1,000,000 of it to retire mortgage bonds under a provision



granting it that privilege, the \$1,000,000 would certainly not be charged against income or surplus account. Then why should the \$100,000 annual charge be considered a "deduction from income"?

To take another case. A newly incorporated company acquired the assets by outright purchase and assumed the obligations of several old public utilities. Among the obligations were two series of bonds which provided for sinking funds, whereby 2 per cent of the face value of bonds outstanding was to be deposited annually with the trustee of the mortgage. The new company was confronted with an obligation to meet the sinking fund requirements, with no surplus to draw upon. The question of sinking fund payments had nothing whatever to do with income. In this case the company sold some of its property not required in operation as a public utility and not covered by the mortgage, instead of borrowing money to pay the sinking fund installments. When it assumed obligations of the companies which it acquired, and carried out the sinking fund requirements, the liabilities (in part funded debt) were reduced from time to time as the sinking fund money was utilized in retiring bonds.

The assets changed their form from time to time as property was converted into the cash used to retire the bonds, but these operations had nothing whatever to do with the income account or the (non-existent) surplus account of the newly incorporated company. If the company had borrowed instead of selling property, its balance sheet, after the transaction had been entirely completed, would have shown an increase in floating debt and a similar decrease in funded debt, it being assumed that a short-term loan had been negotiated for the purpose of retiring bonds in accordance with sinking fund provisions.

#### ACCOUNTING FOR SINKING FUND

The Interstate Commerce Commission profit and loss accounts for electric railways (issue of 1914) contain accounts providing for "appropriations of surplus" for sinking fund and other reserves, for investment in physical property and for dividends. The text of the Account No. 309, pertaining to appropriations of surplus to sinking fund and other reserves, provides that amounts charged to this account shall be concurrently credited to one of two balance sheet accounts which are mentioned. In order to trace the theory of the official system of accounting, a fictitious example of a railway mortgage will be used as an illustration.

The "Great Eastern Electric Railway" has a bond issue of \$20,000,000; interest is payable April 1 and Oct. 1 at the rate of 5 per cent per annum, and its mortgage provides for a sinking fund of 2 per cent per annum of the total bond issue. It is required that the bonds be kept alive and draw interest while in the sinking fund, the interest to accumulate and be used in retiring more bonds. There is a cash balance of \$230,000 in the hands of the trustee on Jan. 15, after the semi-annual sinking fund installment has been paid by the railway. The trustee buys \$205,000 of bonds at 95 and interest on Feb. 1, paying therefor the sum of \$198,166, which includes \$3,416 interest Oct. 1 to Feb. 1 on \$205,000 of bonds. The total amount of bonds redeemed through the sinking fund is \$1,205,000, including those last purchased. The company owns and operates its property, and the plan of accounting for the transactions is shown below.

The monthly accrual of bond interest deductible from income would be based upon the \$18,795,000 of bonds outside the sinking fund, the Interstate Commerce Commission having ruled that the account "interest on funded debts" shall not include charges for interest on

funded debt obligations issued or assumed by the accounting company and owned by it, whether held in its treasury, in sinking or other reserve funds, or pledged as collateral. The commission apparently takes the stand that bonds in the sinking fund are "owned" or "controlled" by the corporation, a ruling to which some accountants object.

The interest, amounting to \$3,416, paid by the trustee as part of the purchase price of \$205,000 of bonds, presents a peculiar but simple problem. It is not known in advance that the purchase will be made at the time and for the amount stated, but the interest on these bonds will properly be included in the monthly accruals deducted from income from October to February, or until they are taken into the sinking fund. From that time forward the interest on these bonds is excluded from the deduction-from-income or so-called fixed-charge accounts.

The interest on bonds kept alive in the sinking fund, drawing interest which accrues to the benefit of the sinking fund, has nothing whatever to do with the income or annual net profits of the corporation. This interest, added to the fixed installments withdrawn from the business for sinking fund purposes, is used for reducing the bonded indebtedness of the company. The money may be taken out of gross receipts, or it may be obtained by selling property no longer needed. The transaction is merely a method of changing the assets and liabilities, for the asset cash is reduced and the indebtedness represented by bonds in public hands is likewise reduced.

The railway accountant desires to set up monthly accruals of the sinking fund in order to segregate this item from the so-called "free" surplus. It may be found necessary later on to use a large part of the surplus for property betterments or some unexpected thing, such as floods or financial stress, and the surplus is not "free" in the sense that it is available for dividends to stockholders. Nevertheless, the accountant accrues each month one-twelfth of the annual charge and concurrently credits the balance sheet account "sinking fund reserves," thus carrying out the wishes of the directors of his company that the recurring liability be shown in the accounts.

#### SINKING FUND VERSUS SINKING FUND RESERVE

There is considerable difference between a sinking fund and a sinking fund reserve, although each title is sometimes loosely applied to the other. Much of the confusion is probably caused by the fact that the term "reserve" is used in connection with banking and insurance in an entirely different sense from that in general accounting practice. Bankers consider a reserve analogous to cash or an equivalent of cash, but in accounting phraseology "cash" and "reserve" are not synonymous. A sinking fund in the strict sense is a "fund raised by annual contributions for the purpose of providing means for paying off a funded debt" (Hatfield). A fund may be defined as "a stock or accumulation of assets, either money or convertible wealth, brought together for a particular purpose" (Pace). On the other hand, a sinking fund reserve may be defined as simply a bookkeeping title of an account.

The fund is tangible, being money or other assets ear-marked for a special use, while the reserve is a term used in accounting for indicating certain desires or policies. An entry may be made opening up a reserve account to which sums are credited monthly, for the purpose of indicating an accruing liability, but the establishment of this account does not mean that funds are in bank to meet the obligation. There is no assurance or guaranty that a reserve will be used for the



indicated purpose, but a fund given to a trustee for a specific purpose or deposited in the bank to meet a certain contingency is a tangible asset to meet a fixed obligation and is generally so used. When the purpose for which a sinking fund reserve account was created has been actually carried out, the account itself disappears by cross entries unless it is retained as an open record and perpetual reminder of the disposition that has been made of a portion of the book surplus.

#### DISCOUNTS, PREMIUMS AND RENTALS

When \$205,000 "Great Eastern Electric Railway" bonds are purchased at 95, there is a discount or saving of \$10,250 which must be disposed of in the accounts. This is not "income," in the sense that income is ordinarily considered, but it is a credit to the profit and loss account. Without considering here the price at which the securities may have been originally sold, it may be said that they are re-acquired at a price which extinguishes \$100 of funded debt for \$95 in cash. The net worth of the corporation, which has carried its bond liability on the books at face value, is increased by the amount of the discount, and the book surplus is written up accordingly. If acquired at a premium the book surplus would be correspondingly reduced.

The remarks regarding the "Great Eastern Electric Railway," as before stated, are based upon the supposition that it owns and also operates its railway property. In case the company should lease its property to the "Consolidated Eastern Railway," which agreed to pay the lessor's sinking fund installments as part of the rental, receiving no credit therefor except as rental, the method of accounting would be considerably changed. The "Consolidated Eastern Railway" accounts would in such a case treat the sinking fund payments as a fixed charge, or deduction from income, the account being "rent for leased roads" in the Interstate Commerce Commission classification of accounts. There are not many leases which treat sinking funds in this manner, it being generally considered more equitable that sinking fund payments made by a lessee on account of a provision in the mortgage of the lessor be accounted for not as rental but as a reduction of funded indebtedness for which the lessee is entitled to compensation or relief.

### Builds Line in Record Time

The Missoula (Mont.) Electric Street Railway, which is owned by former United States Senator W. A. Clark, has established a record for laying a line. On Aug. 10 the Great Western Sugar Company announced that it would build a \$1,000,000 sugar factory at Missoula on a site 1.6 miles from the city limits. Officials of the company conferred with Senator Clark regarding an extension of the railway to the site of the new plant. H. L. Bickenbaugh, superintendent of the local railway, was informed by Senator Clark that the line would be in operation within a month. Rails, trolley wire, ties, and poles had to be purchased, and a considerable amount of grading done.

A crew of men was put to work the day after the building of the line had been authorized. Before Sept. 10 the track was laid, the trolley wires strung, the feeders were installed and the Great Western Sugar Company was requested to give orders as to when it desired its factory material moved over the new line. The construction cost about \$13,000 a mile. Freight service is maintained on the line in Missoula, but it is estimated that the freight business will be increased 60 per cent by the coming of the sugar factory to that city.

### Trolley Guide to Washington, D. C.

Co-operation of Electric Railways Has Resulted in the Publication of an Attractive Folder

AN excellent example of co-operation in publicity work is furnished by the getting together of the Washington Railways & Electric Company and the Capital Traction Company of Washington, D. C., in the publication of a folder of unusual intrinsic value. When opened out, the folder becomes a sheet 18 in. x 24 in. in size, on one side of which is a remarkable bird's-eye view of the city of Washington in colors, the work of H. H. Green. When folded, it is 4 in. x 9 in. in size, the two sides being attractively decorated, as shown in the accompanying halftone. A quarter of one side of the open sheet is taken up with a map of the city, on which the electric railway lines are shown in red. Where the lines extend beyond the field of the map, the points reached by them are indicated and the distances to these points are given. The map is provided with



COVERS OF THE NEW WASHINGTON (D. C.) TROLLEY TRIP FOLDER

marginal scales and an index accompanies it so that the public buildings and other points of interest can readily be located. The remaining space in the folder is filled with brief descriptions of the most important buildings and other sights of the city, several illustrated with halftone engravings.

The purpose of this folder is to impress upon travelers the attractiveness of their national capital and to facilitate their visit to the points of interest by means of the electric railways while they are in the city. The folder was prepared by the Matthews-Northrup Works, Buffalo, N. Y. It is planned to distribute it so that as far as possible travelers who are including Washington in their tours will be provided with copies before they arrive there.

Negotiations are about to be concluded by the Government of Uruguay for the purchase of the commercial electric tramway system of Montevideo, which includes the following lines: Union and Maroñas, Buceo and Union, Este and Reducto, and Sayago and Colon, and other properties valued at approximately \$16,000,000.



# United Railways Power Situation

The St. Louis Traction Company in a Special Report to Its Stockholders Gives Power History, Present Outlook and Comparative Costs

IN the financial and corporate department of this week's issue there appears an analysis of the financial part of a special semi-annual report issued to stockholders of the United Railways of St. Louis for the first six months of 1916. Besides such financial data, however, the report contains matter on other subjects deemed by the management to be of interest to stockholders. Among these subjects is the power situation of the company, concerning which the company's position is as shown in the following abstract of the power section of the report.

At the present time power for the operation of the United Railways of St. Louis is obtained from (1) Water power purchased; (2) Union Electric power purchased, and (3) power produced in the plants of the United Railways. The plants of the United railway are run chiefly as peak plants at a load nearly up to their capacity and at other times are maintained as a reserve against any emergency which might require their use.

For the first six months of 1916 power statistics of the company are as follows:

Average distribution of power on kilowatt-hour basis:	
Electric Company of Missouri (water power).....	58.1 per cent
Union Electric Light & Power Company.....	31.6 per cent
United Railways plants.....	10.3 per cent
Distribution of peak load:	
Electric Company of Missouri (water power).....	40.8 per cent
Union Electric Light & Power Company.....	27.0 per cent
United Railways plants.....	32.2 per cent
Total kilowatt hours during first six months of 1916.....	92,217,593
Average week day peak.....	54,000 kw.
Average daily load factor.....	40.3 per cent
Cost of water power per kilowatt hour.....	0.577c
Cost of Union Electric power per kilowatt hour.....	0.836c
Cost of all purchased power per kilowatt hour.....	0.669c
Cost of generated power (operation and maintenance only) per kilowatt hour.....	0.924c
Average cost of all power per kilowatt hour.....	0.695c

## WATER POWER PURCHASED

The special report to stockholders contains a resumé of the power history of the United Railways since its organization in 1899. To pass over the earlier details, it appears that after the World's Fair in 1904, the business of the United Railways grew rapidly until the financial depression of 1907 and 1908. Conservative estimates as to the power requirements contemplated an increase in demand of at least 10 per cent per year. In 1907 and 1908 negotiations were under way for the sale of water power from Keokuk in St. Louis. The United Railways was not financially able to build an economical power plant of its own, and the price of \$25 per horsepower year, which at 60 per cent load factor amounts to about 0.625 cents per kilowatt hour, was attractive because it was lower than steam power was costing at that time, and there was no indication that the economy of steam power plants would ever be greatly improved. The water power was also attractive on account of the small number of men required to furnish and distribute it, as that seemed to offer immunity from the danger of the source of power being tied up by strikes.

On Oct. 26, 1908, therefore, the United Railways contracted for 27,500 hp. of water power with the right to use 30,000 hp. on peak. If this privilege is taken into account, the price per horsepower year is \$22.92 instead of \$25. On account of changes in the voltage

and point of delivery, the contract price has been reduced \$68,750 per year. This reduction is effective Jan. 1, 1916, and reduces the price per horsepower year to \$22.50 or \$20.62 if the peak is taken into account, and the price per kilowatt hour to 0.577 cents instead of 0.625 cents.

The period of the contract is for ninety-nine years divided into eleven consecutive periods, of which the first period is five years from the initial service date, the next nine periods ten years each and the last period four years. At the end of the first five-year period of service and at the end of each succeeding ten-year period of service there shall be an adjustment made in the price of \$687,500 per year, depending upon the price of standard Illinois mine run coal during the last two years of any such period. For each cent that the average price of such mine run coal exceeds the sum of \$1.42 per ton the price for service shall be increased one-half of 1 per cent. There is a corresponding reduction in price in case the price of mine run coal is less than \$1.42 per ton.

Delivery of power under this contract began July, 1913. The Electric Company of Missouri, which is the successor of the Mississippi River Power Distributing Company, built a transformer station on Page Avenue just west of the city limits. At this transformer station power transmitted from Keokuk at 100,000 volts is transformed to 13,200 volts, at which voltage it is delivered to the United Railways.

## UNION ELECTRIC POWER PURCHASED

Under the terms of the water power contract of 1908, the latest date for delivery of water power was February, 1914. After the contract had been made there was so much delay in financing the water power project that it seemed delivery would not be made before that date, if it was made at all. It was necessary to have additional power for the increasing load of the company for 1910, and as at that time delivery of water power was doubtful, a ten years' contract for additional power was made with the Union Electric Light & Power Company to take effect Jan. 1, 1910. This contract was on more favorable terms than the one in effect at that time, a modification of the first 1903 contract made in 1906 and extending until Aug. 1, 1914.

The amount of power to be delivered under this new contract was as follows: 1910, 6000 kw.; 1911, 9000 kw.; 1912, 12,000 kw.; 1913, 15,000 kw.; 1914, 10,000 kw., Jan. 1 to Aug. 1; 1914, 20,000 kw., Aug. 1 to Dec. 31; 1915, 15,000 kw.; 1916, 15,000 kw.; 1917, 12,000 kw.; 1918, 10,000 kw., and 1919, 5000 kw. The contract specifies during each year the number of kilowatt hours for which the railway company agrees to pay during each calendar month. This number of kilowatt hours is based upon a 45 per cent load factor.

The price which the company pays for this power is as follows: (a) A fixed charge of \$15 per annum per kilowatt (\$1.25 per month). (b) An operating charge of 0.45 cents per kilowatt hour. (c) Any special tax that the producer might be required to pay in connection with this contract. The cost of power taken under this contract has averaged about 0.835 cents per kilowatt hour.



When the United Railways was organized in 1889, it inherited from the constituent companies seven electric plants and a number of cable plants. The electric plants were all small in size, of antiquated design, unreliable in operation, expensive to run and poorly located. In 1907 when the Suburban System was taken over, another electric generating plant was inherited.

In 1900 the St. Louis Transit Company rebuilt the plant at Park and Vandeventer Avenues which formerly belonged to the Lindell Railway, and installed therein 12,000 kw. of direct-current machinery, the largest unit being 2250 kw. This machinery was what was considered modern at that time. The plant not being located upon water, it was necessary to use city water for condensing purposes, and cooling towers were installed so that the condensing water could be used over and over again. A new plant of 6900 kw. capacity was also built in 1900 at Broadway and Salisbury Street. Of this capacity 4500 kw. was direct current and 2400 kw. alternating current. This plant also was not located upon water and it was necessary to use cooling towers in connection with the condensing system.

The plants of the company built in 1900 have become antiquated on account of the great improvements in the design of steam machinery since that time. Operated at their full capacity, they could not supply one-third of the present demand for power. Under the most favorable conditions their efficiency has never exceeded 0.60 cents per kilowatt hour for operation and maintenance alone, neglecting interest on investment, depreciation, obsolescence and all fixed charges. A proper allowance for these fixed charges would be about 0.5 cents per kilowatt hour. This would make a proper charge for generated power as compared with purchased power of more than 1 cent per kilowatt hour if the plants were always operated under the most favorable conditions.

#### COMPARISON OF GENERATED AND PURCHASED POWER

It would be interesting, the stockholders are told in the special report, to estimate what the cost of generated power would have been if the United Railways had carried out its original intention in 1903 of building a new power plant and had started by installing the machinery purchased at that time. To explain this point, it may be said that the growth of the company's business had been very rapid after the consolidation, and in order to take care of the anticipated business during the World's Fair in 1904 it was deemed necessary for the company to have additional power. In 1903 the St. Louis Transit Company decided to put up a power plant and contracted for 16,000 hp. of Stirling boilers and 14,000 kw. capacity of turbine generators for installation in this new plant. After contracts for the purchase of this machinery had been made, it was determined that the St. Louis Transit Company could not make financial arrangements to procure the money to build this power plant, or even to pay for the machinery under contract. In order to relieve the company from this embarrassing situation and insure power for the future operation of the road, especially during the World's Fair period, the first contract was made with the Union Electric Light & Power Company on June 26, 1903, under the terms of which that company took over the machinery which the St. Louis Transit Company had ordered and agreed to furnish power under certain conditions.

The United Railways is now purchasing about 37,000 kw. of power, so that the original installation just described would have constituted about one-third of the plant necessary to supply the power now purchased. The economy of steam apparatus in 1903 was low and

the cost per kilowatt was high as compared with similar machinery at the present time. If the plan of building a power plant in 1903 had been carried out, it would have been necessary to add to this plant from time to time, and the plant at present would consist of 45,000 or 50,000 kw. of machinery representing all the stages of the art between 1903 and 1916. Although the machinery purchased within the last few years would be efficient, the machinery in the primary installation and that installed during the first half of this period would not show such economy.

Taking all these factors into consideration, and using as a basis the operating costs of the large Ashley Street plant of the Union Electric Light & Power Company during this period, the report states that a conservative estimate of the present cost per kilowatt hour of power produced by this hypothetical plant would be about 0.80 cents. This should be compared with the costs of purchased power during the first six months of 1916 as follows: Cost of purchased water power, 0.577 cent; cost of purchased steam power, 0.836 cent, and average cost of all purchased power, 0.669 cent.

If a new steam plant of about 45,000 kw. capacity were built at the present time in a desirable location on the river, equipped with the most modern machinery, it would involve an expenditure, including transmission lines, of not less than \$3,500,000. From such a plant operating on a railway load, an economy of 0.6 cents per kilowatt hour could be expected. It is evident, however, the report states, that up to the present time it has been to the marked financial advantage of the United Railways to have purchased power rather than to have attempted the financing of its own generating plants.

#### FUTURE POWER REQUIREMENTS

At the present time the peak of the load is about 55,000 kw. A conservative estimate of the power required next year is 6 per cent in excess of this peak, or a maximum of 58,500 kw. The capacity of one of the railway plants is now being increased 1200 kw. by certain changes. Under the terms of the contract the power received from the Union Electric Light & Power Company decreases 3000 kw. on Jan. 1, 1917.

The situation is now as follows:

1916 Operation	
Peak .....	55,000 kw.
Water power supplied under contract .....	22,400 kw.
Steam power supplied under contract .....	15,000 kw.
Capacity of railway plants .....	20,400 kw.
Reserve capacity .....	2,800 kw.
1917 Operation	
Peak .....	58,500 kw.
Water power supplied under contract .....	22,400 kw.
Steam power supplied under contract .....	12,000 kw.
Capacity of railway plants .....	21,600 kw.
Deficit .....	2,500 kw.

The contract with the Union Electric Light & Power Company for steam power, which in 1916 calls for 15,000 kw., expires at the end of the year 1919. By that time it is conservatively estimated that the gradual increase in service will cause an increase in load of 10,000 kw. This amount, when added to the amount of power now being purchased from the Union company, calls for facilities available in 1919 having 25,000 kw. capacity. A power plant to furnish 25,000 kw. at all times should have at least 35,000 kw. capacity. The report concludes, therefore, that the United Railways is confronted with these alternatives: (1) The beginning in the near future of the construction of a new power plant with an original installation of 35,000 kw. of machinery requiring the expenditure of a large sum of money. (2) A new contract with a power company for a gradually increasing supply of power as needed.



# Pneumatic Machines Reduce Tamping Gangs from Six to Two

The Experience of a Number of Electric Railways and Actual Test Data Show Excellent Results in Reduction of Labor Cost and Indicate Increased Stability of Track and Roadbed

By H. L. HICKS

Ingersoll-Rand Company, New York

THE development of the pneumatic tie tamper was the natural outgrowth of a demand for a mechanical device that would reduce the cost of ballasting track. The pneumatic tamper has now been in use for about a year and a half on electric railway work, and from the results obtained it is safe to say that this type of machine has come to stay. Its use is already widespread and it is not idle fancy that warrants the prediction that the pneumatic tie tamper will in the course of time practically supersede all hand tamping.



PNEUMATIC TIE TAMPING—FIG. 1  
—TYPICAL TAMPING MACHINE

The pneumatic tie tamper, as its name signifies, operates on compressed air. It is a percussive tool similar in action to the pneumatic riveting hammer. The tamper (Fig. 1) consists of a barrel section, containing a free moving piston, a suitable extended handle with grips for holding it and a tamping bar. The last is inserted in the end of the barrel and is loosely held in place by a retainer fitting over a collar on the tamping bar itself. The piston reciprocates rapidly and delivers a succession of blows on the upper end of the tamping bar which in turn transmits the impact to the ballast.

Pneumatic tie tampers are operated in pairs (Fig. 2), one tamper on each side of a tie. Their weight, 37½ lb. each, is sufficient to feed the tools down as the ballast is forced under the tie. All that is required of the operators is to hold and guide the machines. The tamping bars rest on the ballast and force it down and under the tie. In starting, these tampers are held vertical with the broad faces of the tamping bars parallel with the tie. This position is maintained until the bottom of the tie is reached when they are swung outward until at the proper angle to force the ballast under the center of the tie.

In the operation of the pneumatic tamper the tamping bar is practically stationary, transmitting to the ballast the rapid blows received from the piston. The absence of reciprocating motion makes the guidance of the machine an easy matter. The operator is able to avoid striking and injuring the ties and can guide the tamping bar in between switch points, cross-overs and similar places where he could not swing a pick or wield a tamping bar. It has also been a matter of observation that the pneumatic tamper does not crush the ballasting material.

The pneumatic tamper operates most efficiently on air at 65 lb. to 75 lb. pressure. In terminal yards and on systems where electro-pneumatic signals are used it has been found both convenient and entirely practical to use air from the signal service line, as the small amount used does not impair the operation of the signals. In ordinary traction work air is supplied from a portable compressor, usually electric driven. The customary provision of 300 ft. of hose gives a large working radius without moving the compressor.

While the pneumatic tie tamper works in any kind of ballast it is advisable to change the dimensions of the tamping bar face to suit the size of ballast and thus secure maximum effect from the available power. In



PNEUMATIC TIE TAMPING—FIG. 2—A WORKING UNIT. TWO MEN WITH TAMPERS AND ONE MAN SHOVELING BALLAST

crushed stone, 2 in. or over in size, a bar with a face 3 in. x 5/8 in. gives best satisfaction; with smaller stone or gravel a tamping face 3 in. x 7/8 in. is most effective and in tamping sand, dirt or cinders a still larger face, 3 in. x 1 1/8 in. secures the greatest efficiency.

It is interesting to note the experiences of several electric railways with the pneumatic tamping machines.

The Public Service Railway of New Jersey in extending its trackage in East Orange started tamping with two pneumatic tampers operated from a portable compressor (Fig. 3). The average day's work of three men, two tampers and a shoveler, was sixty ties tamped on both sides for their whole length. Two-inch stone ballast was used and the track lifted 6 in. The foreman's comment to the writer was that ten men hand tamping might beat the two machines but six men could not keep up with them. To expedite still further





Pneumatic Tie Tamping—Fig. 3—Six Machines in Use on Double Track Extension in East Orange, N. J.



Pneumatic Tie Tamping—Fig. 4—Standard Compressor-Car, Public Service Railway, New Jersey



Pneumatic Tie Tamping—Figs. 5 and 6—Tamping Sand and Gravel Ballast, Twin City Traction Lines, Minneapolis, Minn.—Six Men Hand-Tamping Replaced by Two Men with Machines



Pneumatic Tie Tamping—Fig. 7—One-Armed Man Operating Tamper, Twin City Traction Lines



Pneumatic Tie Tamping—Fig. 8—Tamping Stone Ballast on Dual System of Rapid Transit in Queens Borough, New York City



Pneumatic Tie Tamping—Figs. 9 and 10—Tamping Dirt-Gravel Ballast, on Lines of Indianapolis Traction & Terminal Company—Six Men with Shovels Replaced by Two Men with Machines



the construction work an additional double unit of two pairs of tampers, operated from a similar compressor of large size, was placed in operation (Fig. 4).

At Minneapolis the Twin City Rapid Transit Company prepares the roadbed for new track by grading with a steam shovel, dumping in stone ballast and rolling it smooth with a steam roller. A layer of gravel is then added, the ties and track are laid and sand gravel ballast dumped in for tamping. Observations show that on this work two men (Fig. 6) with pneumatic tampers do the work of eight men (Fig. 5) who formerly did tamping by hand. The average time required to tamp the full length of a tie on both sides is one and one-quarter minutes. When the operators noticed that their work was being timed they made a record of three-quarters of a minute. One of the most striking features of the work done here was a demonstration (Fig. 7) that a tamper could be operated by a one-armed man. The discovery was gratifying, not only to the individual but to the company on which he was dependent.



PNEUMATIC TIE TAMPING—FIG. 11—COMPRESSOR FOR ROAD TRANSPORTATION IN ADVANCE OF TRACK LAYING

Thomas Crimmins & Sons, contractors for the laying and ballasting of the track on the concrete viaduct of the rapid transit system extension in Queens Borough, New York City, used four pneumatic tampers operated from a gasoline driven compressor (Fig. 8). The conditions here were rather unusual. The concrete structure had been filled between the sidewalls with 3-in. crushed stone, the depth varying from 5 to 10 ft. This was covered with a 3-in. layer of 2-in. stone, the track then laid and 2-in. stone ballast of an average depth of 12 in. dumped on for tamping. This construction necessitated very thorough work on the part of the tamping machines, to secure a permanently stable roadbed. An average of 550 ft. of track or about 367 ties per day were pneumatically tamped by a gang consisting of four men operating the tampers, two men shoveling ballast and four jacking up and aligning track.

On one of the lines of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., the failure of continuous welded track due to excessive warping made relaying necessary. After employing six men shovel-tamping the dirt gravel ballast two pneumatic tampers (Fig. 10) were tried out and found to do more work than the hand labor, which they replaced (Fig. 9). While the time record of their performance was variable due to the necessary delays in replacing the warped rails, their efficiency of operation was very satisfying to the company. For supplying compressed air to the tampers a standard straight line Ingersoll-Rogler com-

pressor was mounted on a heavy construction wagon together with a short-belted electric motor and air receiver (Fig. 11).

Investigation of results seems to justify the claims that machine tamped track is of greater stability and permanence than hand tamped track. Unfortunately no test data are available on electric railway work. The results obtained by the New York Central may be of interest as an indication of the quality of the work done by this type of machine. As a test 800 ft. of track was machine tamped and a similar length hand tamped. At the end of six months the comparative stability was measured with the following results:

Greatest Settlement		Least Settlement		Average Settlement	
Hand	Machine	Hand	Machine	Hand	Machine
0.116 ft.	0.063 ft.	0.018 ft.	0.004 ft.	0.067 ft.	0.033 ft.

This experiment was conducted on track over the Hackensack Meadows, New Jersey, where the foundation was soft, and for that reason not the ideal place for the purpose. The comparative results observed have been unofficially verified in electric railway work but exact figures have not been compiled.

## How European Roads Deal with Strikes

Mr. Fox Says That Unionism Undermines Discipline and Cites Examples from Abroad of Attitude of Municipalities in Such Cases

IN a letter to the *New York Times* of Sept. 18, John P. Fox, transportation expert, discusses the subject of strikes on electric railways in this country and abroad. Among other things he says:

"It seems to one who has impartially investigated the results of transit strikes in other cities that the public has almost always been the chief sufferer in the end. Higher wages have been followed by inferior service, while unionism has undermined discipline at the expense of safety and the proper treatment of passengers by employees. No one will question the fact that unions have their place, and that strikes are necessary in certain trades, nor the possibility that transit workers may need better conditions and higher wages on some of the lines in New York. But, whether the railway companies are right or wrong in the present instance, the victory of the Amalgamated seems sure to be an injury to the public. Unionism has been carried so far on transit systems in this country that the people must now step in and insist on the consideration of their rights.

"The strongest arguments against the interference of the unions with public transportation are to be found in the experience of British cities. On no transit lines are the workers better treated than on the municipally owned and operated systems of England, with their nine-hour day, six days a week, free uniforms, a week's vacation every year with pay, pensions, bonuses for safety, and frequent increases of wages. And yet these model transit systems, which are generally charged with paternalism, in order to maintain discipline and give adequate service to the public, have found the unions a menace, and have on more than one occasion fought them with every weapon used by the New York companies, such as refusing union recognition, locking out men, employing strikebreakers and even prominent citizens to maintain service, declining arbitration, refusing to reinstate strike leaders, and taking men back only on signing individual contracts.

"The stories of the English tramway strikes read



surprisingly like the New York strike up to the present time, and it is to be hoped that this one will end in the same way, with the subordination of unionism and unreasonable demands to the interests of the public.

"On the Halifax municipal system in 1906 the men struck to compel the reinstatement of a motorman who had caused a fatal accident resulting in the loss of two lives and injuries to other passengers. The city employed strikebreakers, gradually replacing them with local men, refused arbitration on the ground that it could not discharge new men, and took back only a small number of the strikers who were sufficiently penitent and could be given work.

"The English railroad strike of 1911 was coincident with a widespread condition of unrest on the tramway systems, and caused several inconsidered strikes in the large cities. While the municipal managers at times conceded something to the men in order to stop the epidemic of strike fever, the public interests were kept foremost, only reasonable concessions being made; while in some cities the unions were handled without gloves. In Leeds, the men started to strike without notice or any good cause, in spite of the plea of the mayor for a day's delay to initiate arbitration. They were promptly locked out by the manager, obliged to accept the very terms they had rejected, and sign a three years' agreement.

"In Glasgow, where one might expect the unions to have the greatest hold, the sternest measures of all were applied. Concessions had just been made to the men before they went out, so that little consideration was shown them. The municipal manager was given absolute power to handle the strike. Arbitration was refused because it carried with it reinstatement of all the men, and it was decided to retain all new men and never to let certain strikers return. In this case the city itself broke up the union because of its interference with a public service.

In Liverpool, more leniency was shown in taking back the strikers, because they admitted they had been misled, and promised never to strike again. When the men suddenly left their posts in the municipal power house, threatening the city's lighting supply as well as current for the cars, prominent young men took the places of the strikers, and kept the fires, engines, and dynamos going day and night. When the strike was over these volunteer citizens formed a permanent body to respond in future emergencies. Public money as well as private funds were given to the municipal employees who were loyal during the strike.

"While the New York transit lines are not operated by the city, many of them are owned by it, and no city in the world is so dependent on transit as New York is. Unionism has twice interrupted the service, and if the English municipal systems were justified in taking extreme measures to serve the public, are not the New York companies all the more justified, and should not the authorities support them to the end in preventing further interruptions? If the strikers were misled and are penitent, let them be taken back as individuals, but under conditions which will make them remember that they deserted positions of public trust.

"The transit systems of New York and the character of their employees have been steadily improving in recent years. To give in to the union now would demoralize discipline and endanger all the progress in the treatment of the public on the cars. It is greatly to be hoped that the strikers will see their mistake and avoid further conflict.

"To recognize the union would also mean a constant rise in wages without regard to the ability of companies to pay the increase. That is what is alarming

the companies in union cities. While freight rates can be raised on railroads, it is impossible to raise city fares. With the obligations of the dual system to face and a heavier cost of subway construction than ever expected, the City of New York is certainly interested in keeping down the operating expenses of the companies, unless taxes are to be burdened with future deficits."

## Fire and Accident Prevention Day

THE National Fire Protection Association has co-operated with the National Safety Council in preparing for the celebration of a "Fire and Accident Prevention Day" on Oct. 9. In this they will have the assistance of the National Association of Credit Men, the Fire Marshals' Association of North America and the International & Dominion Association of Fire


# FIRE AND ACCIDENT PREVENTION DAY

## OCTOBER 9<sup>th</sup>

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### THE NATION'S FIRE TOLL


5000 DEATHS PER YEAR - \$500 LOSS PER MINUTE  
TWO THIRDS OF FIRES ARE PREVENTABLE

<p>10,000 PERSONS WORKLESS</p> <p>20,000 PERSONS HOMELESS</p>		<p>CARELESS- NESS DID THIS YOUR TOWN MAY BE NEXT</p>
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### THE NATION'S ACCIDENT TOLL

35,000 DEATHS PER YEAR - 2,000,000 INJURIES PER YEAR  
TWO THIRDS OF ACCIDENTS ARE PREVENTABLE

<p>STREET ACCIDENTS KILL AND CRIPPLE</p>		<p>THOUSANDS OF CHILDREN EACH YEAR. YOUR CHILD MAY BE NEXT</p>
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### STOP FIRES AND ACCIDENTS

IN YOUR TOWN, YOUR HOME, YOUR FAMILY

## ONE DAY FOR HUMANITY

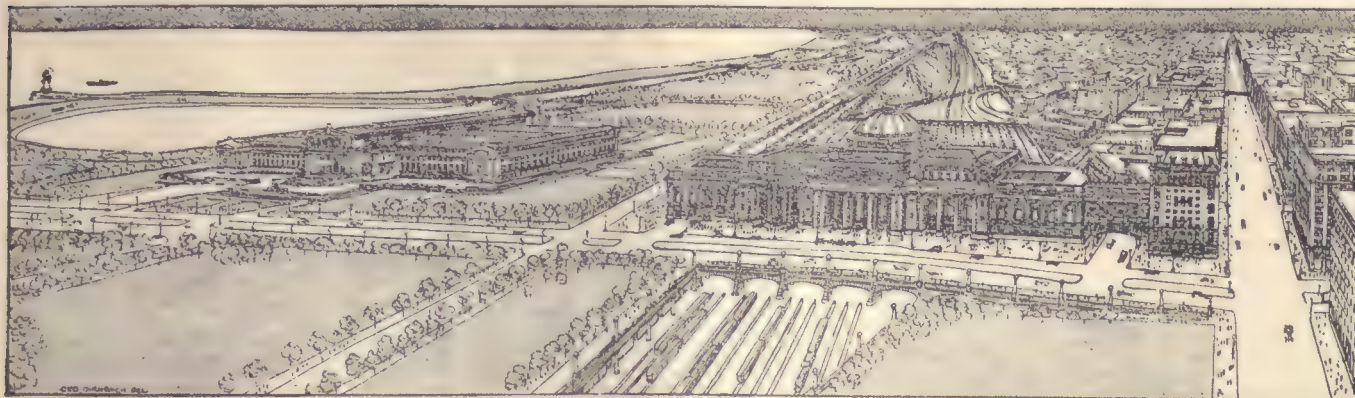
National Fire Protection Association, 87 Milk St., Boston.  
National Safety Council, 208 S. La Salle St., Chicago, Ill.

POSTER USED IN ADVERTISING FIRE AND ACCIDENT PREVENTION DAY

Chiefs. President Wilson and the state governors will issue proclamations and the trade organizations in every town of 10,000 inhabitants and over will be reached. The accompanying illustration is from a large poster, in colors, of which copies, accompanied by suggestion pamphlets, are being sent to all those who desire them. The pamphlet is designed to be helpful in planning the day's exercises.

A recent survey of the several thousand employees of the various companies included in the Illinois Traction System shows that 1200 have been with the company more than five years, 400 more than ten years, seventy for a term of fifteen years, forty-three for twenty-five years, five for thirty-five years and two for forty-five years.





BIRD'S-EYE VIEW OF TERMINAL DEVELOPMENT PROPOSED BY ILLINOIS CENTRAL RAILROAD FOR CHICAGO LAKE FRONT

## Illinois Central Proposes Three-Level Union Station for Chicago

The Illinois Central Railroad has submitted to the railroad terminal committee of the City Council plans for a new \$20,000,000 terminal to accommodate every railroad entering Chicago excepting those using the Northwestern and Union stations. A. S. Baldwin, chief engineer of the railroad, states that the complete development of this plan necessitates the electrification of suburban traffic.

In the proposed terminal station the tracks enter on three levels. The uppermost would contain twenty-four passenger tracks, the middle level would be devoted to freight and express traffic, while on the low level, to be reached by subway, suburban traffic would be handled.

The accompanying illustrations reproduced from the *Chicago Herald* of Sept. 21 are typical of the drawings submitted by Mr. Baldwin to the terminal commission on Wednesday of this week. They show a head house or station proper with a frontage of about 700 ft. and a depth of 250 ft. Its architecture is of Ionic style and it is designed to harmonize with the Field museum under construction to the east. In the bird's-eye view a hotel is shown located on the corner of Michigan Boulevard and Twelfth Street extended toward the east. A bridge across Indiana Avenue extended north to Grant Park connects the hotel with the station.

The plan calls for the separation of grades at Eighteenth Street, the long distance trains ascending and the suburban trains descending. It is also proposed to purchase a 200-ft. strip immediately north of Eighteenth Street extending to the south branch of the Chicago river, to intercept other lines which might contract

to use the terminal. There would be an entrance into the terminal yards at Eighteenth Street, a distance of about 3500 ft. from Twelfth Street. This connecting line would be brought to the yard at a considerable elevation.

It is also proposed to extend the Twelfth Street surface car line to the east boundary of the Illinois Central property, the tracks being depressed under Michigan Boulevard.

At present no agreements have been made with the other roads which would have to use the terminal to make it a complete success. There is also no definite proposition regarding electrification. While, as stated above, Mr. Baldwin considers the electrification of the suburban lines necessary for the complete development it is not necessary to a partial development as the lines can be brought in on the present level.

The committee showed interest in the plans presented but suggested a more tangible proposition which was promised within a month. In the meantime the other roads interested refuse to commit themselves as to their attitude in the matter.

The Court of Appeals at Vancouver, B. C., has decided that the liability for paying the damages in the Main Street runaway car case of September, 1914, in which the pranks of mischievous school boys resulted in a collision between runaway freight cars and a street car, with two deaths and numerous accidents, falls upon the British Columbia Electric Railway. The Appeal judges have relieved the Dominion Creosoting Company, which as the consignee of the freight cars was made a co-defendant in all the suits, from liability to pay damages.



FACADE OF PROPOSED LAKE FRONT RAILROAD TERMINAL FOR CHICAGO



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

## ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

Changes in the Tentative Program for the Atlantic City Convention of the Association Are Announced—  
At a Meeting of the Manila Company Section the Duties of Trainmen  
Were Discussed

### Changes in Tentative Convention Program

Since the publication of the tentative convention programs in the issues of the *ELECTRIC RAILWAY JOURNAL* for Aug. 12, page 280, and Sept. 16, page 496, the following changes have been announced:

*American Association.*—The first committee report on Tuesday morning, Oct. 10, will be by the convention committee instead of the committee on subjects. Capt. S. D. Embick, United States Coast Artillery Corps, will deliver an address on Tuesday morning on "Electric Railways and Preparedness," in place of Brig.-Gen. Erasmus M. Weaver. The last report on this morning will be that of the committee on cost of passenger transportation service.

To the Wednesday morning program two committee reports have been added at the end; those on street traffic and conference with the United States Bureau of Standards as to the Safety Code.

At the Thursday morning session Frank J. Sprague, consulting engineer, New York, will give the address on "The Physical Development of Electric Railways," and A. B. Leach, A. B. Leach & Company, New York, one on "The Financial Development of Electric Railways." The first report on this morning will be one by the committee on recommendations in the president's address.

*Accountants' Association.*—The committee on passenger, freight and express accounting will not present the report scheduled for Wednesday afternoon.

*Engineering Association.*—The report of the delegates to the National Good Roads Congress will be the last item on the program for Wednesday afternoon.

*Claims Association.*—At the Monday morning session the written discussion on "Workmen's Compensation Acts" will be presented by Leonard J. Tynan, attorney Public Service Railway, Newark, N. J.

*Transportation and Traffic Association.*—At the joint session with the Engineering Association on Tuesday afternoon the block signal committee report will be discussed first.

On Thursday afternoon T. S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va., will speak on "Company Publications, Their Use and Value"; and J. A. Braden, passenger agent Northern Ohio Traction & Light Company, Akron, Ohio, will speak on "Company Publications, Their Preparation and Publication." These are in addition to the speakers on these topics already announced.

### Capital Traction Men Get Together

Company section No. 8 started off the fall work with a "get together" meeting on Sept. 14 with a round hundred members present. J. H. Hanna and D. S. Carll, vice-presidents of the company, congratulated the section on the progress made in eight months and expressed the hope that not only would the membership increase but that the members would more actively participate in the programs and discussions.

G. Thomas Dunlop, attorney for the company, described in an instructive manner the operation of the claims and legal departments, and explained how greater co-operation between the claims and other departments

could be fostered. Paul Proctor of the transportation department and Charles Richmond of the mechanical department also entertained the members with piano and vocal numbers. It was announced that the next meeting of the section will be held on Oct. 19.

### Discussion of T. & T. Association Reports

President H. A. Nicholl of the Transportation & Traffic Association has sent to the general managers of member companies and others copies of a letter emphasizing the importance of attendance at the convention and participation in its proceedings. He directs attention to the program of the T. & T. Association meeting printed in the September issue of the association magazine and in the *ELECTRIC RAILWAY JOURNAL* for Sept. 16.

### Annual Meeting Manufacturers Association

The American Electric Railway Manufacturers Association will hold its annual meeting on Wednesday, Oct. 11. Arrangements have been made for the use of the Park Avenue hall of the Marlborough-Blenheim Hotel. This hall is on the ground floor directly under the main office of the hotel. The exact hour of the meeting will be announced in the Convention Daily issue of the *ELECTRIC RAILWAY JOURNAL*.

### Duties of Trainmen Discussed in Manila

Joint company section No. 5 held its nineteenth monthly meeting in Manila on Aug. 8 with forty-three members present. The paper of the evening was on "Duties of Trainmen" by Eugene Wager, traffic inspector in the transportation department.

Mr. Wager outlined clearly the elements of cultivating good-will on the part of the public, stating that in years of railroad and street car service he had never found a passenger whose anger could not be dissipated by courteous treatment. He gave the transportation men valuable practical advice; emphasizing the importance of poise. To quote him directly on this point: "Some conductors can have a car full of passengers and their fares all collected with no show of hurry or excitement, and one thus able to give the proper attention to passengers boarding and leaving the car, answering all questions without snapping their heads off. They can give the proper signals to their motormen, thereby preventing costly accidents and long stops which all cost money to their company; and they can do this without causing unnecessary delays to their passengers, who are in a hurry to reach home in time after the completion of their day's work."

"The motorman and conductor must always bear in mind that they have very trying jobs, serving the public, but they also have passengers on their cars who may have had equally as trying a day as themselves. On the other hand, we have the conductor who rides at the same point and with the same kind of a load who has not half collected his fares, his cap is on the side of his head, his coat is unbuttoned and he is wet with perspiration from unnecessary excitement and worry. He



is unable to answer his passengers' questions politely and he signals his motorman to go ahead without looking to see if there are passengers trying to get off or on the car. He misses fares, accepts old or late transfers, etc."

An excellent point made by Mr. Wagor was that the man who uses the most power in operating his car is the most tired out when he leaves the carhouse at night. This is due to the fact that he wastes his own physical energy in applying the brakes with too much force. As another result the equipment suffers also.

The paper was discussed by representatives of several departments, and in closing the discussion, vice-president C. N. Duffy humorously called attention to the advantages which the employees have over the stockholders. He said: "We employees should congratulate ourselves on the advantage that we have over the owners of the property in that we, unlike them, have no money invested in the property subject to the risks and uncertainties of the business; that we receive our wages first while the owners receive theirs in the shape of returns on their investments providing the profit from operation yields such returns; that we as employees could easily change our business if we cared to do so, that the owners of the property could not unless they could get out of it the 14,000,000 pesos which they have invested in it."

## COMMUNICATIONS

### Mr. Henry on Public Relations Outline

AMERICAN ELECTRIC RAILWAY ASSOCIATION  
INDIANAPOLIS, IND., Sept. 14, 1916.

To the Editors:

I have been very much pleased with the work in your issue of Sept. 2 on "Improvement of Public Relations." This is certainly finely done and cannot but result in a great deal of good. I have gone over it carefully and must say that I have never seen anything on the subject so well done. The industry is very much indebted to you for it. CHARLES L. HENRY, President.

### Unit for Comparing Track Upkeep Costs

THE SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION  
DALLAS, TEX., Sept. 8, 1916.

To the Editors:

I have been reading with very much interest the editorials and communications on a desirable unit for comparing track upkeep costs, and the more that the subject is exploited the greater is the proof of the writer's contention that "there ain't no such animal." The reason for this is that there are too many variants—almost as many as there are miles of paved-in electric railway track in the United States. If the variants were confined to the track itself, it would even then hardly be possible to find a unit that could be made to include them all and still be convenient and accurate for comparison. But when it is remembered that there are outside variables almost as innumerable as those in the track, it is easily appreciated that such a unit is an engineering, operating and statistical impossibility. Both of the communications in the Sept. 2 issue of the JOURNAL emphasize this point. Mr. Berry goes into the matter a little more thoroughly than does Mr. Mitchell and, taking up his own suggestions, he would have in the neighborhood

of 1500 variables, divided fairly evenly among the three "classes" which he suggests.

Personally, I fail to see why the time, thought and exertion of the A. E. R. E. A. should be wasted on this matter when any unit on which they might agree would be an absolutely arbitrary one and of no value for general comparison. There are so many pressing matters at the present for the attention of the A. E. R. E. A. which are infinitely more valuable and are infinitely more easy to achieve than this will-o'-the-wisp of a "track upkeep unit."

The same is true with regard to the space occupied by the disquisitions on this subject in the technical journals, in convention and committee proceedings, etc. A thorough reading of all the written matter on this subject shows that it consists almost entirely of either impracticable suggestions for such a unit or of disquisitions on the fact tending to prove that such a unit is an impossibility at the present time.

H. S. COOPER, Secretary.

### Corporations as Employers

JOHN A. BEELER, CONSULTING ENGINEER,  
BOSTON, MASS., Sept. 16, 1916.

To the Editors:

One does not hear the term "soul-less corporation" used as it was twenty years ago for the reason that the big corporations are usually the best employers. Individual employers cannot begin to give their employees the benefits accorded by means of pensions and kindred advantages accorded by the large incorporated concerns.

The article appearing in the JOURNAL for Sept. 2 on "Improvement of Public Relations" was the most concise and complete résumé of things desirable along those lines that I have seen. From personal experience with a number of the policies enumerated, I know that they pay in every way not even excepting the financial side. However, when a company enters into such methods purely from a selfish desire to profit financially thereby, it means failure from the start.

First and always the plan adopted must be because it is right to do so. That fact established is the first step. Then the administration of the policy must be sincere, never losing sight of the fact that the basis is to do what is right. This fosters internal enthusiasm in the concern which, when it pervades the organization to the point of absorption, bubbles over, inoculating patron and public. Then it is a success.

JOHN A. BEELER.

### Name for One-Man Car

CHICAGO, ILL., Sept. 18, 1916.

To the Editors:

Seeing in your issue of Sept. 16 an inquiry as to a suitable name for the "one-man car," I suggest the name "Tram-Bus." A FRIEND.

New testing codes have been issued by the American Society of Mechanical Engineers, which contain rules for conducting performance tests of power plant apparatus, such as boilers, reciprocating steam engines, steam turbines, pumping machinery, compressors, blower and fans, complete steam power plants, locomotives, gas producers, gas and oil engines and water wheels. These codes have been prepared by a committee of experts, the power test committee, under the chairmanship of George H. Barrus, and represent six years of work of the former testing codes of the Society.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

New Insulator Clamp to Replace Tie Wires—Trolley Wire Which Broke but Six Times in Eight Years—A Track Sander that Hits the Curves—Homemade Rail Grinder with Extra Derailing Wheels—Improved Ball-Bearing Journal Box—Simple Circulating Pump for Air Compressor

### Trolley Wire Experiences of the Union Railway, New York

Long Life Records of Wire Which Is Used Under  
Severe Operating Conditions

BY J. D. KENT

Electrical Engineer of the Company

The earlier installations of trolley wire on the Union Railway lines in the borough of the Bronx, New York, were of No. 00 hard-drawn copper. However, as early as 1908 it was found desirable to install wire of greater toughness and larger cross-section on Westchester Avenue between Kelly Street and a point 200 ft. east of Prospect Avenue. This pioneer installation, put up in the spring of 1908, comprised  $\frac{1}{2}$  mile of No. 0000 grooved Phono-Electric wire. This wire has been in use since that date on a route with car headways as low as thirty seconds, therefore a record of its behavior is not out of place.

Like its predecessors, the wire is carried in a trough which is suspended from the cross-struts of the elevated railway structure at this location. Up to 1908 the height of the trolley wire varied according to the height of each cross-strut, so that trolley wheels were frequently derailed at the breaks in grade of the overhead. The new wire, however, was suspended to remain consistently parallel to the paving.

A far more difficult operating condition which could not be solved so readily was that of clearance. The distance between car roof and trolley wire was so scant that the wire had to be offset 10 in. to 12 in. in order that the pole might clear the springs of the trolley base. Naturally, this offset introduced considerable side wear on the wire. Another bad condition was due to the fact that the tracks were on a 4 per cent grade.

It has been noted that the original wire was No. 00 hard-drawn copper. Under the severe operating conditions described, this wire had to be renewed at least twice a year, and breaks were frequent, sometimes occurring within a week after erection of the wire. The record of the present wire to June, 1916, shows a total of six breaks in eight years, and but one break was due to car operation. The other breaks were due to fouling by high vehicles.

Recent calipering of this pioneer layout shows that the diameter of the wire has worn down from the original dimension of 0.482 in. to an average of 0.360 in., and a minimum of 0.205 in. As long portions of this wire are approaching the 40 per cent wear allowed for this wire, it will be replaced during the current year. When scrapped this No. 0000 composition wire will have given more than sixteen times the life of No. 00 copper—a most remarkable record.

#### LATER INSTALLATIONS

As a continuation of the original  $\frac{1}{2}$ -mile described, the company put up during May and October, 1914, 4 miles more of the same No. 0000 grooved wire to replace No. 00 copper. The  $4\frac{1}{2}$  miles cover Westchester Avenue between Third Avenue and Southern Boulevard. Another case of rapid wear was on the  $\frac{1}{5}$ -mile stretch under the Third Avenue elevated structure between 145th and 149th Streets. The wires are carried from short bulldog hangers, excessive wear arising in the center of the bulldog clamps which are about  $3\frac{1}{2}$  in. long. The No. 00 copper here was replaced with the No. 0000 composition in June, 1914, and is still in good shape, although the rush-hour headway under it is one-half-minute or less.

The latest replacement of a long length of No. 00 copper with grooved No. 0000 composition wire is for 4



BRIDGE ACROSS HARLEM SHIP CANAL SHOWING METHOD OF INSTALLING TROLLEY WIRE IN TROUGHS



miles put up during May and June, 1915, on White Plains Avenue between Gun Hill Road and the city line. The four car lines on this route have a combined headway slightly below two minutes. An unusual installation of No. 0000 Phono-Electric wire is on the bridge which spans the Harlem Ship Canal at 223d Street. The length of this installation, including the bridge approaches, is  $\frac{1}{4}$  mile. The wire, extending between Isham Street and 225th Street, replaces an iron bar construction which had been found to be too noisy.

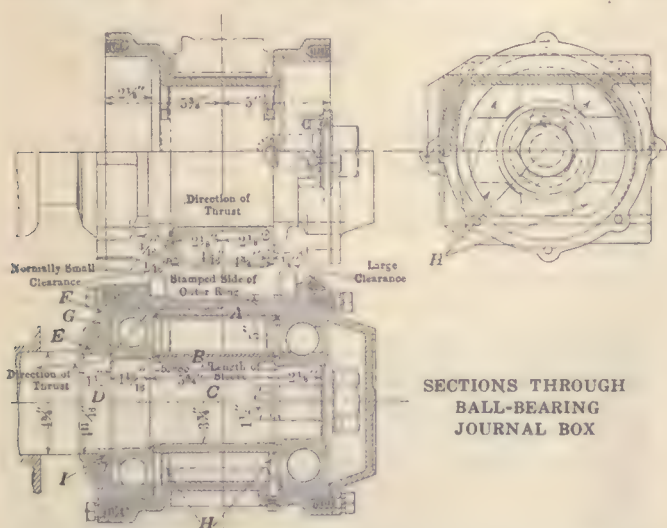
## An Interchangeable Ball-Bearing Journal Box

This Box Complete with Bearings Can Be Slipped on the Axle and Locked Securely to It

BY O. BRUENAUER

General Sales Manager Gurney Ball Bearing Company

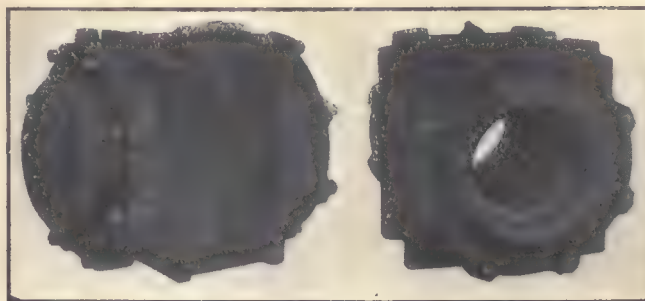
In the ELECTRIC RAILWAY JOURNAL of June 10, 1916, page 1036, there appeared an abstract of a paper given by the writer before the Illinois Electric Railways Association on "Application of Ball Bearings to Railway Car Journals." The following description of a journal



box, complete with bearings which has been designed for use on standard trucks is supplementary to that paper.

With this journal box all that is now required by a car builder or user is to turn down the axles to fit the bores of the bearings and provide for a suitable locking device on the end of the axle. The box with the bearings may then be slipped over the axle and may also be taken off as a unit when wheels are to be changed.

The drawing herewith shows the standard box designed for use on a 25-ton street car. The general principles of the design are the same for all purposes and



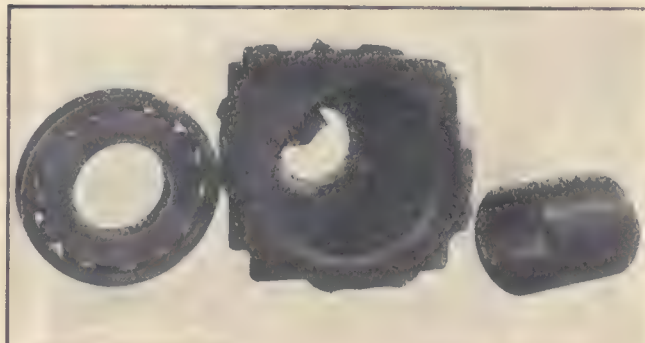
BALL-BEARING JOURNAL BOX READY FOR MOUNTING

the variations are governed merely by the size of bearing that will be required for certain weights of cars and the type of truck to which the boxes are to be applied.

The bearings used in connection with these boxes, which are also shown herewith, are of the "radio-thrust" type. The balls make contact with the races at an angle which affords a thrust capacity of 100 per cent of the radial capacity. Due to the angular contact of these bearings, the slack or end play must be taken up. The method of taking up this end play is one of the characteristic features of the design.

As shown in the drawing which appears opposite, the thrust sides of the outer rings of the two bearings face each other. Between the respective faces of the inner rings of the two bearings is the spacer sleeve C. Its length, B, in relation to the shoulder distance A is such that when the bolt on the end of the axle is screwed down, the inner rings of the bearings with the intermittent spacer sleeve are locked tight against the shoulder D on the axle, and bring the outer rings of the bearings in proper contact with the shoulder of the box. No matter how tight the bolt may be screwed down there can be no cramping of the bearings. The whole design is entirely independent of any adjustment and the locking device, which is the bolt, may be screwed down as hard as the threads will permit.

When the car is going straight ahead the bearings in the box take purely radial load. In going through a right-hand curve the inside face of the pedestal, having normally a clearance of  $\frac{1}{16}$  in. with the inside face of the slide of the box, will come in contact with the inside face of the right-hand box, thereby transmitting the thrust in the direction indicated on the drawing onto the inside bearing in the right-hand box. This inside bearing is at this moment carrying the least radial load, while the maximum radial load is carried by the left-hand box. The left-hand box is not in contact in any way laterally with the pedestal and no thrust can be transmitted onto its bearings for the reason that there is very large clearance ( $\frac{1}{4}$  in.) between the outside face of the left-hand pedestal and the outside faces of the box slides. In other words, when the car sways to the left the pedestals are in contact only on the inside face



DETAIL VIEWS OF INTERCHANGEABLE BALL-BEARING JOURNAL BOX



of the right-hand box and no thrust whatever is being transmitted on any one of the other three bearings. This method of distributing radial and thrust loads in such a way as to make the bearings with the least radial load carry the thrust and to relieve the bearings carrying the maximum radial load of all thrust makes decidedly for safety and economy of construction.

Since the boxes are furnished complete with the spacer sleeve, perfect interchangeability of parts is obtainable. In consequence any man of ordinary intelligence who is capable of handling a monkey wrench can mount the boxes on the axle. Under ordinary conditions there is no necessity for taking the bearings out of the box. Eight lugs, *H*, support the spacer sleeve in a central position when the box is not on the axle.

On the rear end of the box next to the wheel is a dirt seal which has been mentioned previously. A stationary collar, *F*, is screwed to the box. Collar *E*, revolving with the axle, fits with a given clearance into the collar *F*. As a result there is a grist-mill action with surfaces revolving against each other. Grit or dirt between these two surfaces is driven out and none can get in. The device is at the same time an oil seal. Screw plugs for filling the box with lubricant and for draining it are provided at the top and bottom of the box respectively.

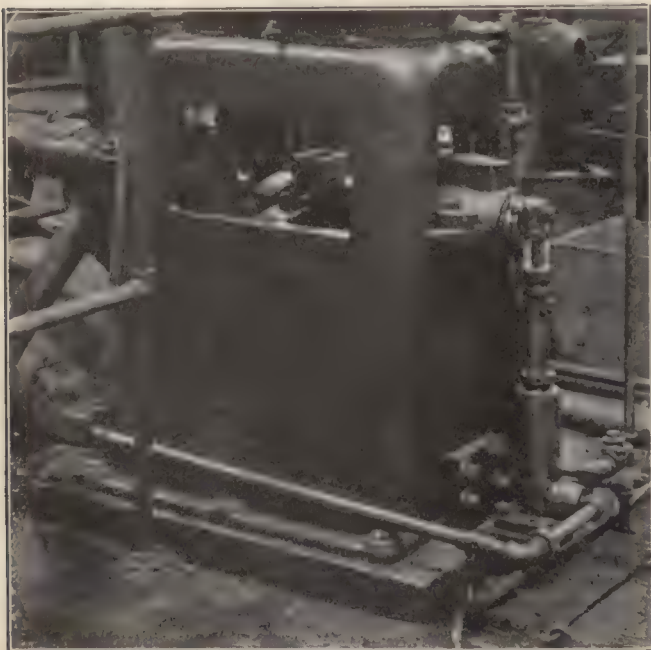
In this type of bearing the designers have aimed to eliminate the difficulties connected with the assembling and adjustment of bearings by mechanics unskilled in such work. By furnishing it as a unit the required accuracy of machinery and absolute interchangeability of parts are assured.

### Pump Cuts Down Compressor Circulating Water Cost

BY HARRY BRANSON

Superintendent of Equipment, Lehigh Valley Transit Company, Allentown, Pa.

The yearly water bill of the Madison Street shop of the Lehigh Valley Transit Company, Allentown, Pa., formerly amounted to about \$200. It is now less than \$50. The little pump shown at the side of the air compressor in the accompanying illustration has accomplished this saving for the company.



AIR COMPRESSOR EQUIPPED WITH SMALL CIRCULATING WATER PUMP

The compressed air for shop use is supplied by an air compressor having two 8-in. x 8-in. cylinders and a speed of 100 r.p.m. Formerly the circulating water for the compressor was taken from the city mains and wasted after passing through the water jacket. A pump, designed by the writer and made in our own shops now maintains a constant supply of circulating water. A tank 18 in. in diameter and 4 ft. high is located about 20 ft. above the compressor. From this tank the water flows by gravity through the compressor jacket and down to the pump, which forces it back to the tank. All of the piping is  $\frac{3}{4}$  in. in diameter. The pump plunger is  $1\frac{1}{2}$  in. in diameter, and has a 6-in. stroke. It is connected by a short link to a small crank on the compressor crankshaft. The water is taken in at the bottom of the pump through a ball valve. The outlet pipe, which is just above the intake, is provided with a check valve.

This method of supplying cooling water for an air compressor is simple and can be readily applied in any shop as one means of reducing the water bill.

### Rail Grinders on the Boston Elevated Railway

The Boston Elevated Railway since 1899 has been using a flexible shaft grinder made up in the company's shops at a cost of about \$350 which includes a 1.5-hp. electric motor installed on a light two-wheel cart, as shown in the accompanying illustration. The shaft of this grinder is made by the Stow Manufacturing Company, of Binghamton, N. Y. The shaft is 8 ft. in length and connected to the motor through a universal joint.

The company now has six of these machines in service. These grinders can be used for work in grooves,



PORTABLE RAIL GRINDER USED IN BOSTON, MASS.

on the tread, and along the gage line. The wheel used is 10 in. in diameter and 1 in. thick for groove or gage-line work, and 1.5 in. thick for the tread grinding.

Considerable work is done with this grinder following the electric welding by the three Indianapolis welders. Other uses are grinding center plates and special work.

The cart which carries the motor stands alongside the track without impeding traffic to any extent. The wheel and shaft are easily removed on the approach of a car, and as readily replaced in working position, the weight of this portion of the machine being about 30 lb.

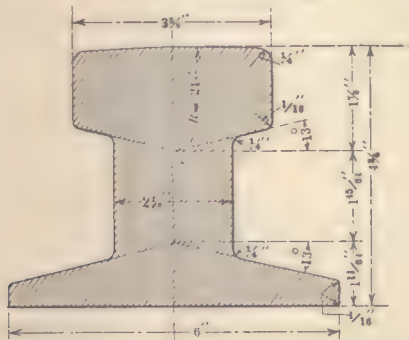
With skillful manipulation, which an intelligent trackman soon acquires, excellent work can be done with this machine. The roadmaster estimates that the average cost for grinding joints is about 40 cents each.



## 150-Lb. Third-Rail for New Lines of the Interborough in New York City

The Interborough Rapid Transit Company will install approximately 100 miles of 150-lb. third-rail on its new lines which form part of the dual system of rapid transit of New York City. The accompanying illustration shows the cross-section of the third-rail that has been developed for these lines. The actual weight is 153 lb. per yard, and the cross-section is slightly more than 15 sq. in. The principal dimensions are shown in the illustration. The rail will be supplied in 60-ft. lengths, 10 per cent of which may be shorts.

The specifications for this rail call for a carbon content of not less than 0.15 per cent and a resistivity of



150-LB. NEW THIRD-RAIL FOR THE INTERBOROUGH RAPID TRANSIT COMPANY

not more than seven times that of annealed copper. The percentages of manganese, sulphur, phosphorus, silicon, etc., are not specified.

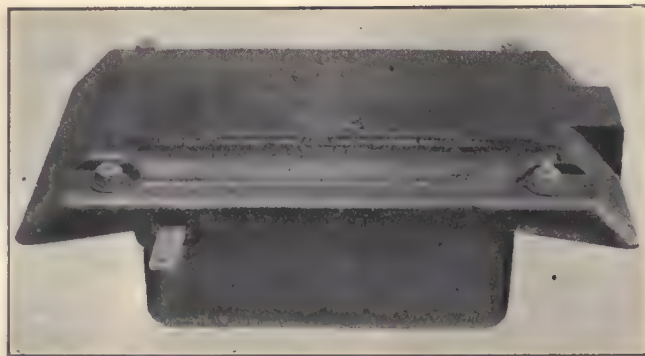
A notable fact in connection with this rail is that the percentage of carbon is unusually high for a material having such high conductivity. This means that the rail will be stiffer, that the installation will be simplified, and that it can be used in 60-ft. lengths, thus requiring approximately one-half the usual number of bonds.

## A Protected Impedance Bond

The latest development in impedance bonds for use on electrified portions of trunk lines as well as on inter-urban railways is that of the bond shown mounted in its case in the accompanying illustration. The connections for the rails are brought out at the side rather than at the end, and the bond has a cover designed to prevent the breaking of the bond or leads by dragging equipment. The rail connections are brought out in such a way that the cables leaving the bond will lie between two ties. An end opening is provided for the neutral connection between bonds. These bonds are of two capacities, rated at 500 amp. and 1500 amp. direct current per rail. They will take care of a 20 per cent unbalancing without the impedance of the bond being seriously affected.

The purpose of these bonds is to provide a low resistance path around insulated joints for propulsion current and at the same time to provide sufficient impedance to the a.c. signaling current to maintain a potential which will allow the track winding of a relay to be normally energized. A train on the track section to which the bond is connected will short-circuit its windings, in this way producing zero potential across the relay terminals. These bonds are manufactured by the Union Switch & Signal Company, Swissvale, Pa., under the balanced bond patents.

Bonds similar to the above are being used in the electrification of the Chicago, Milwaukee & St. Paul Railway



IMPEDANCE BOND WITH PROTECTING COVER DESIGNED TO FIT BETWEEN TWO TIES

through the Bitter Root and Big Belt Mountains in Montana and Idaho.

## Steel Ties Used in Shallow Roadbed

The accompanying illustration shows the installation of track of the Mahoning & Shenango Railway & Light Company on the new concrete arch bridge across the Mahoning River at Warren, Ohio. This is another instance in which International twin steel ties have been used on a concrete bridge where the clearance between the base of rail and the concrete floor of the bridge is small. As shown in the illustration, the top and sides of the track trench are painted with a heavy tar preparation, so that the track construction can be renewed at the end of its life without disturbing the bridge floor.

The first large installation in which the steel twin ties were placed on concrete bridge floors was the con-



TRACK INSTALLATION ON CONCRETE BRIDGE, WARREN, OHIO

struction of the track on the Brooklyn-Brighton Bridge at Cleveland, Ohio, described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 16, 1915, page 834. Here the clearance under the rail was only 4 in. Since then there have been many instances in which engineers have used the shallow steel ties for locations having limited clearance.

The Kansas City Railway's mechanical department welds all its broken motor frames by the thermit process. Although it is somewhat more expensive than other welding processes that could be employed, the thermit furnishes a much stronger weld, at least one has never been broken in service, and it is possible to reinforce the motor frame wherever this is required.





TRACK SANDER INSTALLED ON A DOUBLE-TRUCK CAR OF THE MILWAUKEE NORTHERN RAILWAY

### A Cheap Track Sander

The Haese Track Sander Company, Milwaukee, Wis., has recently placed on the market a new track sander, shown herewith. This device consists of a flexible telescoping spout of No. 16-gage, cold-rolled steel and is double-walled throughout to be used in connection with air. The inner lining is constructed so that the sand cannot escape, and it is impossible for water or slush to get up into the sander. The upper end of this sander is fastened to the car and the lower end to the truck, which causes it to follow the rail with the truck as shown.

This sander has been used in actual service for more than a year on the Milwaukee Northern Railway and has been found to give satisfactory results. According to the claims of the maker, car wheels last longer, rail wear on sharp curves is reduced, time and power are saved in starting, and accidents are prevented by the use of the sander.

### A Well-Designed Home-Made Portable Air Compressor

Frequent calls for compressed air service in various parts of the repair shops of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., as

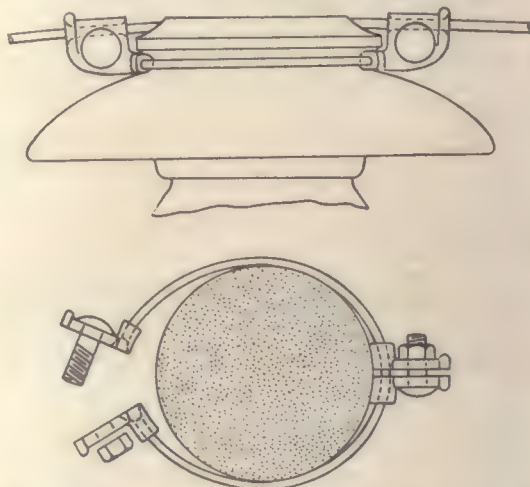


AIR COMPRESSOR MOUNTED ON A TRUCK IN SHOPS OF BENTON HARBOR-ST. JOE RAILWAY

well as at the company's substations, created a demand for a portable air compressor outfit. This was supplied by the compactly-built, well-designed equipment which is shown in the accompanying illustration. A standard Westinghouse 14-cu. ft. air compressor is mounted on a substantially built truck and connected through a governor and automatic control equipment to a reservoir tank mounted on a strap-iron frame over the compressor proper. The truck was built in the railway's shops, and the complete air compressor outfit was assembled there. The automatic control cuts the compressor out of service when the air pressure reaches 70 lb. and puts it in service again at 65 lb. The compressor is equipped with a flexible cord to connect it to the source of energy, and a section of hose makes it possible to furnish compressed air for practically any service. The labor cost in assembling this equipment was about \$10, and aside from the wheels on the truck, the material and the equipment used was some that had been on hand in the railway company's shops.

### A Novel Insulator Clamp

An improved insulator clamp, shown herewith, has just been patented and placed on the market by Edwin D. Hatch, consulting engineer, New York City. This



NEW INSULATOR CLAMP WHICH REPLACES TIE WIRE

device is made of two clamping members and a piece of wire extending around the insulator head. Each clamp consists of two pieces of sherardized malleable iron with a bolt extending through the center. The clamps are hinged at the ends so that they can readily take any vertical angle above or below a horizontal which the line wire may assume in passing over a hill or up the side of a mountain.

According to the maker, these insulator clamps are not rigid, but are designed, nevertheless, to be used with any size of insulator. Clamps of other designs are said to have injured insulators by chipping or causing crystallization of the line wires. Again, clamps which have not been designed to meet slight variations in insulator sizes either fit the insulator head too tightly or too loosely, with the result that some part is injured. Many times, line wires have been carried entirely above the insulators when they were somewhat smaller than usual, thus causing the clamps to carry the load instead of the top of the insulators. The clamping members at each end are free to move around the encircling wire so that, should the insulator top groove be slightly off center, adjustment can readily be made for such a condition.

It is claimed that this clamp can be installed at prac-



tically the same cost as an ordinary tie, since it takes a much shorter time to attach the clamps to the line wire, and that the work can be done for about half the amount it costs for an ordinary tie, for the reason that cheap labor can be employed. The method of installing these clamps is to pull the wire to the correct tension with block and tackle for a number of spans, and while it is being thus held the wire is inserted in the clamp, the bolt tightened up, and the blocks slacked off.

## Rail Grinder Made from Scrap

Frequently a little skill and ingenuity will make a repair shop scrap heap or a quantity of stored useless material yield a useful piece of equipment. In any event such was the case with the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., when the need for a rail grinder coupled with a resourceful master mechanic produced one which operates perfectly. This rail grinder consists of a wooden framed truck fitted with a motor-driven grinding wheel which is adjustable both vertically and horizontally. The truck is equipped with a set of adjustable wheels for removing it from the track when on paved streets. A view of this grinder is shown in the accompanying illustration.

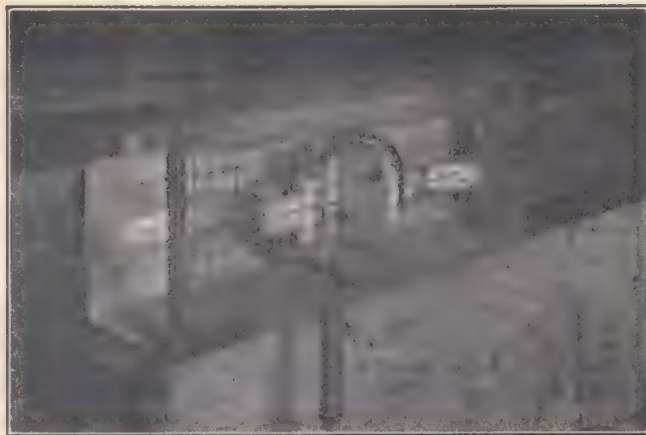
The grinding wheel is driven by a chain belt which



HOME-MADE RAIL GRINDER USED ON THE BENTON HARBOR-ST. JOE RAILWAY

connects it to a 5-hp. d.-c. motor. The motor was a piece of discarded equipment, and so were the chain belt and the shaft on which the 4-in. x 12-in. carborundum grinding wheel is mounted. The motor is set up on a 4-in. x 16-in. plank which also carries the grinding wheel. The plank in turn is supported on three vertical screws fitted with hand wheels, so that the grinding wheel may be adjusted vertically, and one horizontal hand screw gives it a 4-in. horizontal adjustment. The grinding wheel is mounted over the track rail and the top is boxed and covered with a glass shield so that the operation may be observed, and at the same time the eyes of the workmen are protected. Two hand screws with swiveled castings and flanged wheels are mounted on one end of the grinder truck so that it may be removed from the track by lowering these wheels to the pavement. Two men experience no difficulty in derailling the grinder which weighs about 800 lb.

The track wheels and axles upon which the grinder is mounted were also reclaimed from the scrap pile. The wheels are 20 in. in diameter and they have 2-in. treads and  $\frac{3}{4}$ -in. flanges. The hand screws were obtained from a local junk dealer so that practically the only new material in the complete grinder was the carborundum grinding wheel and the lumber and bolts used to fasten the truck frame together. When this grinder is moved over the road it is coupled to one of the roadway utility cars, and when in service it is moved along the track by hand.



PIT LIGHTS IN SHOPS OF LEHIGH VALLEY TRANSIT COMPANY

## Pit Lights Mounted on Girder Rail

The proper lighting of the repair pits in railway shops is a matter which is often neglected. The result is that insufficient illumination is obtained, the lamps are frequently broken and short-circuits occur in the long lamp cords which are commonly used.

To obviate these difficulties, Harry Branson, superintendent of equipment Lehigh Valley Transit Company, has mounted the pit lights in the Madison Street shops of the company on the side of the track girder rails, as shown by the accompanying illustration. The lamps are protected by a heavy wire netting, but they are accessible on the ends so that they can be easily renewed. The heavy sheet of tin between the lamps and the rail acts as an excellent reflector.

## Corrosion Forces Rail Renewal

As a general proposition, corrosion is seldom the actual cause for making a rail renewal, although in many instances it is largely contributory. Recently Charles H. Clark, engineer maintenance of way Cleveland Railway, in taking an inventory of the tracks in need of rehabilitation during the construction season of 1916 made an interesting experiment to determine the extent to which a rail was corroded. Although the exposed surface of the rail shown in the accompanying illustration indicated that repairs would carry the track over for at least another season, an examination of the rail web showed that it was practically corroded through. The accompanying illustration shows where Mr. Clark drove an ordinary clay pick through the web. It will also be noted that practically a knife edge, indicating the advanced stage of the corrosion, had formed along the edges of the rail base.



VIEW OF CLAY PICK DRIVEN THROUGH CORRODED RAIL WEB



## NEWS OF ELECTRIC RAILWAYS

### NEW YORK STRIKES WELL IN HAND

#### Threat of General Trade Union Strike, However, May Cause Further Trouble in New York City

A frantic effort on the part of leaders of the Amalgamated Association of Street and Electric Railway Employees to bolster up the losing strikes in New York City, in the face of constantly bettered service on the surface lines affected, has been the outstanding feature during the last week. Since this paper went to press last week the strike situation has spread to cover the New York & Queens County Railway, thus involving all the lines except one that were included under the peace settlements of Aug. 6 and 7. Under the threat of a general sympathetic strike of trade unionists in the metropolis, the strikers have been endeavoring to induce the public authorities and business interests to force the companies to bow to the union's terms, but the railways have steadfastly refused to treat with the Amalgamated Association in any way, and the proposal of a general sympathetic strike has been received with marked apathy by trade union leaders and with frank displeasure by the public. In general, therefore, the situation has shown improvement, except that disorder in the last few days has increased. Increased vigilance on the part of the police, however, and the determination of the city authorities to punish guilty strikers to the full extent of the law bid fair to keep the situation in hand.

To take up the strike story where left off last week—on Friday, Sept. 15, the Third Avenue Railway announced new wage schedules of 27 cents per hour for the first year and 30 cents per hour thereafter for its motormen and conductors, the former rates being 26 cents per hour for the first year, 29 cents per hour for the second-fifth years and 30 cents per hour thereafter. The storage-battery car rates were also increased from 25 cents per hour the first year to 26 cents per hour, and from 27 cents to 28 cents thereafter.

Late in the same day the Public Service Commission for the First District issued a formal finding of culpability against the organized employees of the Third Avenue Railway for their breach of the peace settlement of Aug. 7. All the commissioners joined with Chairman Straus and Mayor Mitchel in holding that the strike was an "action without justification and in violation of their compact." They stated that the strike should be called off at once, but this suggestion was disregarded by the union leaders.

On Saturday the Brotherhood of New York Railways Employees offered to permit strikers to return to work as members of this organization. Attached to this offer was the condition that they should return as workers lower in seniority rank than those who had remained loyal, as well as those who had entered the service of the company since the strike started. The returning strikers, however, would receive the same pay they had prior to the new wage scale of Sept. 3, and they would not forfeit their seniority to a greater extent than falling in line behind those now in the service of the company. Their conditions would be still further improved after six months of faithful service.

The first definite action along the line of authorizing a general sympathetic strike of trade unionists was taken on Friday night, when the Central Federated Union of New York recommended that "as a preliminary to the general strike, all unionists, such as Tidewater Boatmen and Longshoremen, International Brotherhood of Teamsters, engineers, firemen and plumbers, and such other trades whose labor is keeping the traction cars running, stop work," and that there be a general boycott of all the traction lines in New York. Beginning with Saturday, however, it became increasingly evident that the unions involved in this "preliminary move" were less interested in the losing fight of the Amalgamated Association than in the possible settlement of grievances of their own. The first step in the general strike was expected on Monday, Sept. 18, but only two of the unions mentioned in the recommendation of the Central Federated

Union took strike votes, and these concerned demands of their own to be submitted in due course.

The union leaders on Monday at a conference with Mayor Mitchel made another attempt to force the traction lines to arbitrate certain points, and the advisory committee of unionists issued a statement to the effect that if by Friday, Sept. 22, at 2 p. m., the Mayor had failed to secure a peace settlement, a time for the general strike would be designated. The traction officials said, however, that the strikes were broken, that they had to look out for the interests of their loyal employees and that there was nothing to arbitrate. Conferences during the week between the traction officials, the city authorities and representatives of the Merchants' Association and the Chamber of Commerce failed to bring any change in the situation.

Late on Thursday, Sept. 21, Mayor Mitchel and Chairman Straus sent a letter to the trade union leaders, stating in part as follows: "Conditions which you have indicated might follow general sympathetic strikes would be grossly violative of the laws and would convulse the civilized and orderly life of the community. We wish to make it unmistakably clear to you that to prevent those conditions the full civil and military powers conferred by law upon the Mayor will be employed."

The existing strike situation was somewhat broadened on Monday night by the entrance of some union employees of the New York & Queens County Railway into the controversy. About 200 out of 560 motormen and conductors of this line, in spite of the settlement agreement of Aug. 7, went out on strike at midnight, because, it was alleged, the Queens company had furnished men for Manhattan lines to use as strikebreakers. President William O. Wood denied that any employees had been sent to help out in Manhattan.

The service offered on the various lines during the week showed improvement. The rapid transit lines continued to carry more than the number of passengers carried a year ago, and the surface operation increased each day. From 327 cars on Thursday, Sept. 14, the New York Railways without strikebreakers increased its service to 540 cars on Thursday, Sept. 21, out of a normal of about 1290. During the same period the service of the Third Avenue lines in Manhattan rose from eighty-three cars to 139 cars, the normal being 505 cars, while the allied Union Railway in the Bronx increased its car total from 141 to 181, the normal being 252. The Second Avenue Railroad, with a normal of 105 cars, did not increase its service by more than a few cars to a total of twenty-seven. Starting with half operation after the strike on Monday night, the New York & Queens County Railway gradually bettered its service. The lines of the Yonkers Railroad and the Westchester Electric Railroad, the Westchester County subsidiaries of the Third Avenue Railway, offered no service during the week on account of the restrictive experience ordinances in force.

No night service was offered on the surface lines in Manhattan until Monday, Sept. 18, when three Third Avenue Railway cars ran on cross-town lines until 11 p. m. After that this company kept on increasing its night service, and the New York Railways made an endeavor to lengthen its service gradually, but the lines were handicapped by outbreaks of violence, the first really serious ones since the strikes started. On Wednesday night strikers attacked four cars near Central Park and had to be dispersed by police reserves. After this the district attorney's office announced that strikers and strike sympathizers guilty of injuring persons through attacks on street cars would be prosecuted under the section of the penal law providing for penitentiary sentences of five to twenty years for such offences. On Wednesday night Theodore P. Shonts, as president of the Interborough Rapid Transit Company and the New York Railways, announced that a reward of \$200 would be paid for evidence resulting in the conviction of any person who injured a passenger by throwing missiles.



## PURCHASE OF POWER RECOMMENDED

## Engineers Advise Against Rehabilitation of Old Plant at Cleveland

At a conference in Cleveland, Ohio, on Sept. 15 it was decided to abandon and scrap the Cedar Avenue power station of the Cleveland Railway as the result of an unfavorable report from F. Sargent of Sargent & Lundy, and to purchase power from the Cleveland Illuminating Company and build a new 12,000-kw. capacity 60-cycle substation on the site of the old power house.

Mr. Sargent's report to Fielder Sanders, Street Railway Commissioner of Cleveland, follows in part:

"I have made an examination of the Cedar Avenue power plant of the Cleveland Railway and have investigated from an engineering point of view the proposed scheme of the Cleveland Railway for the installation of a new mixed pressure turbine of 5000 kw. capacity and beg to submit the following comments:

"The Cedar Avenue power plant of the Cleveland Railway was originally designed and located as part of a dual manufacturing process, in which the steam was first used for the manufacture of electric power for the railway by reciprocating engines and direct current generators and the exhaust steam was used for the manufacture of salt.

"The plant was evidently located from a point of view of the economic distribution of a certain amount of direct current for driving the street railways and more or less with a view of a favorable location for the manufacture of salt.

"The part of the process relating to the manufacture of salt has now been permanently abandoned and the plant is used solely for the manufacture of electric power, the steam being exhausted into the atmosphere.

"The plant as it now stands, while in a good state of repair and very reliable in operation, is not economical. From a fuel consumption point of view it requires at least double the coal per unit of output as compared with the latest practice in large plants. Progress has been such since this plant was built that the machinery, from the boilers to the generators inclusive, is obsolete in type and arrangement as compared with the best modern practice.

"The location of the plant is such that no natural water supply suitable for condensing purposes is available and artificial cooling of condensing water in this locality is not practicable because of the liability of damages to surrounding property from entrained water blown out of the towers and freezing where it falls in winter time and wetting surrounding property in summer time. In high winds the discharged finely divided water will carry one-half mile or more from the plant. We have experienced much difficulty from damage suits due to the use of cooling towers in similar locations in Chicago.

"It is a great mistake to erect cooling towers of large capacity in thickly populated districts of large cities because it is bound to lead to trouble with surrounding property owners.

"This means that the scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy that has been estimated in the report when this question of damages to surrounding property is fully considered.

"There is no practicable way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation.

"In view of the situation as herein presented it will probably be unnecessary for us to prepare any further recommendations in regard to power supply, but if anything more is desired we shall be very glad to meet your wishes."

Mr. Sanders' report to the City Council follows in part:

"I beg to report that the request of the railway company for permission to rehabilitate its Cedar Avenue plant has been carefully investigated by this office. As a result of an investigation of months by the regular engineering force and consulting experts especially hired in the city, your commissioner has come to the conclusion that the Cedar Avenue power plant as now constituted is causing a great loss to the railway company, that power is being generated there at just about twice what it should cost. This is not due, however, to uneconomical management, but to the inherent drawbacks of the plant itself, the same being ineffi-

cient, obsolete, and requiring twice the coal per unit of power that it should. We feel, therefore, that there is a loss at the present time of nearly \$200,000 a year in the operation of this plant as now constituted which loss will continue to grow instead of to decrease. The proposition of the railway company to rehabilitate is, in our opinion, impracticable. After much discussion with the railway engineers, they now concur in that view, and agree even if rehabilitated according to their scheme, that power cannot be produced as cheaply as it can be bought in this city, and further, that the resultant damage to the neighborhood of the plant will be great.

"In view of the fact that the amount of money involved in this plant including the salt works, exclusive of land, is estimated at \$1,265,565, and the importance of the question of disposing of it obvious, your commissioner was unwilling to rely wholly upon the opinion of your engineers and the company's engineers and secured the advice of Sargent & Lundy, electrical engineers of Chicago. Frederick Sargent made a careful investigation of the plant as it now stands and reports that 'there is no practical way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation. The scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy.' I inclose herewith a copy of his report.

"The reproduction value of the plant, including the salt works, but exclusive of land, has been carefully estimated at \$1,265,565, from which, however, will be deducted, if your body approves the proposition, the salvage value of the machinery, which will amount to approximately \$115,565. Under the Tayler franchise, as now constituted, if the plant is abandoned, it will be necessary for Council to authorize an over-expenditure in the maintenance account of \$1,265,565, this sum of money will be placed in a suspense account and by agreement between the company and the city will be reduced at the rate of \$20,000 a month until it is extinguished, thereby spreading the amount over a period of five years. This procedure, if carried out, in my opinion, will not affect existing conditions, because according to the figures the purchase of power will save approximately \$200,000 a year. At the end of five years the initial loss will be made good, and then there will be at least ten years of steady saving of \$200,000 a year during the life of a new substation.

"In addition to authorizing this over-expenditure in maintenance, it will be necessary for Council to authorize the expenditure of \$250,000 for the building of a converting substation at the site of the Cedar Avenue power plant, which will be a capital charge, and also to authorize the entering into a contract by the Cleveland Railway for the purchase of its power in the future.

"I beg to recommend that Council take this action immediately, as it seems, in my opinion, to be absolutely necessary and advisable."

#### \$1,000,000 FREIGHT TERMINAL PROPOSED FOR DETROIT

An investment of \$1,000,000 is involved in the plans of the Detroit (Mich.) United Railway for the construction of its freight terminal in Detroit to take the place of the terminal it has long occupied at Congress and Fifth Streets.

The new terminal will occupy nearly three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street. The property includes the old Pullman car shops purchased by the company several years ago and used as the general shops of the company. Outgrowing the accommodations as general shops, the company has been gradually constructing handsome new shop units on its Highland Park property. These units, now all nearly completed and occupied, form one of the most perfect car shops in the country. East of the old car shops at Dequinder and Macomb Streets the company has purchased the additional territory required and is preparing to remove or raze the buildings now on it.

The plans for the new freight terminal are practically ready and when the work is done Detroit will have the finest accommodations possible with a layout of tracks designed for exceptionally rapid handling of freight.



### MAYOR CALLS AMALGAMATED OFFICER A MIGHTY BAD MAN

By unanimous vote the City Commission of Harrisburg, Pa., on Sept. 12 refused to amend the jitney regulations and referred the initiative petition presented through the efforts of the striking trolleyman of the Harrisburg Railways to the people, who will vote upon the measure at the election on Nov. 7. Reduction of the bond from \$2,000 to a \$1,000 pool, to cut down the license fees and the penalties for violations were prayed for. Behind the movement were the striking trolleyman and jitney drivers who were led in their campaign by J. J. Thorpe, of the Amalgamated Association. Mr. Thorpe talked to newspapermen in the Council Chamber just after the passage of the measure. He is reported to have said:

"What could we expect? We didn't expect anything else but that they would do exactly what they have done; they are only controlled by the Harrisburg Railways and merely are carrying out the instructions of the Harrisburg Railways and not the request of the public. The people will be on the job at the polls this fall and there will be the damndest stir-up in politics round here that you have ever seen. Some of our friends will take the walking plank."

Mayor Meals is reported to have commented as follows on Mr. Thorpe's statement:

"If he doesn't shut his head we'll make him. Our oaths of office, I suppose, mean nothing in his estimation. He's not even a citizen here; he's only here in the interests of the few dollars he gets out of it. The strike could and would have been settled—but for him—six or eight weeks ago. On a Tuesday morning, I don't recollect the exact date, he would not let his men meet the company except as a committee from the union. On the following Friday he agreed to eliminate the union, and so submitted this to me in writing—and I've got the typewritten statement. It is signed, I think, by Hugh McLaughlin, but it came through Thorpe. Then immediately after that President Musser stated that he would not meet the strikers except individually. The citizens of Harrisburg did nothing to him, yet he strikes back at the citizens by threatening to organize every branch of labor, even, I suppose, to the washwomen and street sweepers. Those are the kind of dogs that we don't want in Harrisburg. You can say for me that I consider him a mighty bad man."

### PRESIDENT BRUSH OUTLINES BOSTON ELEVATED NEEDS

In an interview in the *Boston Globe* of Sept. 18, Matthew C. Brush, president of the Boston Elevated Railway, referred briefly to the problems confronting the company in relation to the forthcoming investigation of its financial requirements by a legislative recess commission. Hearings will begin at the State House, Boston, on Sept. 25. Mr. Brush stated that at that time the company will present a full statement of the conditions which the road is facing. He emphasized the burdens placed upon the system by the construction of subways and intimated that it is not fair that the entire burden of expense in this direction should fall upon the car-rider. The increase of land values in West Roxbury, Cambridge, Watertown, Belmont, Arlington, Brookline, Brighton and Newton following the opening of subways reducing the running time between these suburbs and the center of Boston was cited and the present frequent service contrasted with former facilities. The burdens of the transfer situation were also touched upon. Fifteen million paper transfers were wasted last year by passengers. In the course of his remarks Mr. Brush said:

"It is a delicate problem that of transfers, but its treatment will certainly be one of the important points to be set before the committee. For in one way or another we must have increased net revenue for our company, and that means relief in some sort from the burdens—of which I consider the subways the greatest—which our company carries and which are imposed on no other company doing a like business elsewhere. I want the people of Greater Boston to take pride in this big company of ours. When a hitch occurs and some man finds he is not getting the service he thinks he should, I want him to realize that it is not because of the size of our job, in handling 600,000,000 persons a year, and

not because we, the company officials, are not trying to give the best we can. Everybody in Boston has always been very kind to me, and I appreciate it, and I shall do my best for them and for Boston. I have no secrets here; you can come and see me at any time, and what you ask, if I am able, I will answer. Square dealing and all above board—that is all I can offer you."

### COURSE IN CONCRETE CONSTRUCTION WORK OFFERED

The Portland Cement Association, representing the manufacturers of Portland cement in the United States and Canada, recognizing the value of schooling and appreciating the training that a young man may gain even by a short association with a competent corps of instructors, is co-operating with the Lewis Institute, Madison and Robey Streets, Chicago, in offering a special course in concrete work for contractors and foremen. The course, which will be a practical one, will open on Monday, Oct. 9. Prominent engineers and contractors will assist in the instruction and lectures. The expense for attendance will be small and there are no entrance requirements. Electric railway engineers are invited to consider the value of this course for their foremen in charge of concrete work.

### RESTORING TRAFFIC IN PARIS

In the *ELECTRIC RAILWAY JOURNAL* for Sept. 9, page 463, an item was published to the effect that street cars of the Paris (Tex.) Transit Company were again being operated by means of power from the plant of the Texas Power & Light Company at Waco. The item as worded may have conveyed the impression to some readers that the Paris Transit Company had not been operating cars since March. The fire in Paris to which reference was made started about 5.30 p. m. on March 21, destroyed nearly all of the business district and 50 per cent of the residences. The Paris Transit Company lost four cars out of the total of eight, and more than 2 miles of trolley were down out of a total of 6 miles. At 1 p. m. on the afternoon of March 24, three days later, service was resumed with the four cars that had been saved, one of the principal deterrents to the earlier operation of cars being the impassable condition of the streets, due to inability to secure sufficient labor to clear away the debris promptly. The old plant of the company was completely destroyed by fire, but power was immediately available from a new Diesel plant recently completed and in full operating condition at the time of the fire. Four days later, or about March 28, cars purchased in Waco were received and placed in service by the Paris Transit Company, thus completely restoring the schedule. The company reports that the receipts have increased steadily and are at the highest they have ever been. The Waco connection referred to in the *ELECTRIC RAILWAY JOURNAL* of Sept. 9 was recently effected to assist the local plant in taking care of the greatly increased loads due to power consumption by local industrial concerns. In the *ELECTRIC RAILWAY JOURNAL* of May 6, 1916, page 861, appeared an article on the fire in Paris giving the facts in connection therewith and illustrated with halftones showing the ruins of the carhouse of the Paris Transit Company and the ruins of the office and power plant of the Texas Power & Light Company.

**Wages Increased in Port Arthur.**—The Port Arthur (Tex.) Traction Company has advanced the wages of its trainmen. The increases range from 1 cent an hour for newly employed men to 3 cents an hour for men in the employ of the company for five years or longer.

**Movies of Electrics.**—For the purpose of informing Pennsylvania Railroad employees of developments in the electrification of steam railroads, motion pictures of the electrification of seven railroads were shown on Sept. 20 at the West Philadelphia Branch of the Young Men's Christian Association in Philadelphia.

**New Working Agreement in Manchester.**—An agreement which will run for two and a half years has been reached between the Manchester (N. H.) Street Railway and its employees. The employees asked for an increase in wages and other changes in working conditions, including car tickets entitling them to ride on the cars without the neces-



sity of showing their badges in lieu of regular fare. The new agreement makes no change in the hours of labor, but provides for an increase in wages. The request for the change to car tickets for the employees was waived by the representatives of the men.

**Increase in Wages on Niagara Gorge Line.**—Burt L. Jones, general manager of the Niagara Gorge Railway, Niagara Falls, N. Y., operating the American Niagara gorge route line, announces a new wage scale for platform-men. All employees, including track and carhouse men, have been granted voluntary increases, effective at once. The scale of the platform-men is: First-year men, \$65 a month; 26 cents an hour for second-year men; 28 cents an hour for third year; 30 cents an hour for fourth-year men, and 33 cents an hour for all who have been with the company more than four years.

**Postponement of Cincinnati Loop Lease Vote.**—The Rapid Transit Commission of Cincinnati, Ohio, has apparently reached the conclusion that submission of the terms of the lease of the proposed rapid transit loop to the voters at the November election is impossible. So many features enter into this important matter that the seven weeks remaining before the election will not be sufficient for their consideration. Frank S. Krug, chief engineer of the commission, said that the computation of the data secured through the traffic survey can not be completed before Nov. 1. These data are of importance in fixing the terms of the lease and not much headway can be made until the results can be had for use.

**Philadelphia Transit Conference Postponed.**—A conference between Mayor Smith, William Hancock and Col. Sheldon Potter representing the city of Philadelphia, Pa., and T. E. Mitten, president of the Philadelphia Rapid Transit Company, Director of City Transit Twining and Ellis Ames Ballard, counsel for the transit company, scheduled for Sept. 21, has been indefinitely postponed. This action was taken by Mayor Smith when he learned that Mr. Mitten would be unable to be present because of a death in the family. The Mayor said he would call another meeting as soon as Mr. Mitten returned to the city and could take up the business. A conference of the city transit directors to consider the conditions of the lease of the proposed new rapid transit lines to the Philadelphia Rapid Transit Company was held earlier in the week.

**Violence Resorted to in Harrisburg.**—The first violence growing out of the strike of the trainmen of the Harrisburg (Pa.) Railways in several weeks occurred Saturday night, Sept. 16, when Motorman Martin A. Brandt had his skull fractured by a rock. Brandt was operating a Hummelstown line car which ran over and killed George W. Fox, who was lying intoxicated on the car tracks in a lonely place 5 miles east of the city. When Brandt returned from Hummelstown near the scene of the accident a huge rock was hurled through the window striking him on the head. He stuck to his post for more than a half mile and then fell unconscious. The county police and detectives in the employ of the Harrisburg Railways are at work on clues which they believe will lead to the arrest and conviction of the motorman's assailants.

**Schenectady Arbitration Award Announced.**—The arbitrators' award in the settlement of the wage differences between the Schenectady (N. Y.) Railway and its employees has been made public. It provides for a three-year agreement, increased wages and the restoration of the practice of giving passes to employees. Motormen and conductors will get a 2-cent increase from May 1, 1916; one-half cent increase next May and one-half cent increase in 1918. Other employees of the company also benefit. The situation with respect to wages on the Schenectady Railway became acute in May, when the men struck to enforce their demand for a flat increase of 5 cents an hour. The company at that time offered an increase of 2 cents an hour, to be in effect for the next two years, and an additional 1-cent increase for the third year. Arbitration was agreed to after the men had been out on strike thirty-six hours. Only the questions of wages and length of the agreement were arbitrated. The conditions under which the arbitration was conducted were published in the ELECTRIC RAILWAY JOURNAL for May 13, page 920.

## Financial and Corporate

### RAILWAY INVESTORS ORGANIZE

The committee of stockholders under the leadership of John Muir, a New York banker, which became active at the time of the recent railway labor crisis in Washington, has now organized on a permanent basis as the Railway Investors' League. An official advertisement states:

"The Railway Investors' League has been formed to consolidate for protective and beneficial action that immense power and influence now unused but vested in thousands of unorganized small investors. Whether you own one share or one thousand shares of stock, a single \$100 bond or larger amounts, your active aid is needed. You can help to protect your own investment and safeguard the principles of constructive enterprise on which the country has been built up. The purpose of the league is to assert, maintain and defend the rights of railway security holders, to guard against attacks from without and within.

"Impelled by the passage in Congress of the Adamson law, under which four classes of railroad employees are granted a large increase in wages without consideration of the merits of their demand, the general need for such an organization became imperative. Refusal on the part of the defiant labor leaders to abide by the principle of arbitration, intensified by presidential endorsement, has created a natural fear of similar demands from other employees. Guided by this and other unfortunate experiences which have demonstrated the necessity, the organization committee issued a preliminary statement which is meeting with a quick response."

### TAXABLE VALUATIONS IN IOWA

The 1916 taxable valuations for interurban electric railways in Iowa, as fixed by the executive council of the State last July and now published in that body's forty-fifth annual report, total \$2,005,163 for 486.24 miles of road. The 1915 valuations for the same electric lines amounted to \$1,810,491 for 477.80 miles of road. The total taxable valuation for all the steam railroads in the State for 1916 is \$78,865,593 for 10,029.38 miles of road, as compared to a 1915 valuation of \$78,880,376 for 10,016.71 miles of road. Other 1916 valuations follow: Transmission lines, \$308,075; equipment companies, \$235,800; sleeping cars, \$430,186, and express property, \$311,653.

The detailed lengths and taxable values of Iowa interurban railways as of Jan. 1, 1916, are shown below:

	Miles of Road	Taxable Value Per Mile	Total Taxable Value
Cedar Rapids & Marion City Railway..	21.94	\$8,500	\$186,490
Centerville Light & Traction Company..	7.84	3,500	27,440
Charles City Western Railway.....	23.35	3,500	81,725
Davenport & Muscatine Railway.....	25.27	3,500	88,445
Fort Dodge, Des Moines & Southern Railroad .....	117.97	3,500	412,895
Inter-Urban Railway .....	64.20	3,500	224,700
Iowa & Illinois Railway.....	33.05	3,700	122,285
Iowa Railway & Light Company.....	55.09	3,700	203,833
Mason City & Clear Lake Railroad....	14.62	4,500	65,790
Oskaloosa & Buxton Electric Railway..	2.30	3,700	8,510
Southern Iowa Railway & Light Com- pany .....	10.00	3,000	30,000
Waterloo, Cedar Falls & Northern Rail- way .....	110.61	5,000	553,050
Total .....	486.24	.....	\$2,005,163

### INITIAL P. R. T. DIVIDEND

The Philadelphia (Pa.) Rapid Transit Company on Sept. 20 declared an initial dividend of 2 per cent, payable on Oct. 11 to stock of record Oct. 4. Retiring directors of the Philadelphia Rapid Transit Company were re-elected at the annual meeting. The board met later and organized by re-electing the retiring officers. At the annual meeting of Union Traction Company stockholders on Sept. 20 James G. Balfour and John C. Gilpin were elected to the board to succeed George W. Elkins and Jacob S. Disston. The other directors were re-elected.



## ANNUAL REPORTS

## United Railways of St. Louis

The comparative income statement of the United Railways of St. Louis, St. Louis, Mo., for the six months ended June 30, 1915 and 1916, follows:

	1916	1915
Transportation revenue .....	\$6,163,836	\$5,717,056
Revenue other than transportation.....	47,469	45,347
Gross earnings from operation.....	\$6,211,305	\$5,762,403
Operating expenses .....	\$3,421,879	\$3,403,145
Depreciation .....	745,357	627,054
Taxes .....	403,734	359,111
Total .....	\$4,570,970	\$4,389,310
Income from operation .....	\$1,640,335	\$1,373,093
Miscellaneous income .....	50,346	48,220
Gross income .....	\$1,690,681	\$1,421,313
Deductions from income.....	1,282,714	1,306,193
Net income .....	\$407,967	\$115,120
Dividend on preferred stock.....		
Surplus .....	\$407,967	\$115,120

The foregoing figures are contained in a special semi-annual report to the stockholders. It is stated that as a result of the settlement of the old mill tax litigation and the payment of \$1,839,205 for the adjudicated claims, there were a number of inquiries from stockholders as to the condition of the property. The company, therefore, deemed it an opportune time to place before the stockholders a statement of present condition, while at the same time outlining the important problems confronting the company, such as in the matters of the mill tax situation, the power situation, maturing securities and new property requirements. The company's position on the power question is stated elsewhere in this issue.

The financial statement included in the report shows that the gross earnings from operation during the first six months of 1916 increased \$448,902 or 7.79 per cent as compared with those of the corresponding period last year. The operating expenses showed a net increase of \$18,733 or 0.55 per cent owing to an increase in wages and in the amount set up for damages and law expenses. The total expenses, including depreciation, increased \$137,036 or 3.4 per cent as compared with the corresponding period last year.

The income from operation, after deducting the total expenses and taxes, increased \$267,242 or 19.46 per cent as compared with the same period last year. The gross income increased \$269,367 or 18.95 per cent. The fixed charges decreased \$23,478 or 1.8 per cent owing to the retirement of Southern Railways 6 per cent bonds May 1, 1915, and the St. Louis & Meramec River Railroad 6 per cent bonds May 8, 1916, and also to the purchase of various underlying bonds. The net income, therefore, gained \$292,847 or was more than tripled.

The total number of passengers carried for the first six months of 1916 as compared with the corresponding period of 1915 was as follows:

	1916	1915
Revenue passengers, 5 cents.....	121,642,725	112,371,381
Revenue passengers, 2.5 cents.....	2,545,424	2,292,102
Total .....	124,188,149	114,663,483
Transfer passengers .....	66,312,251	60,158,867
Total passengers .....	190,500,400	174,822,350

The percentage of revenue passengers using transfers during the first six months of 1916 was 53.40. During the first six months of 1915 it was 52.47, an increase of 0.93 per cent.

The capital expenditures made by the company for the six months ended June 30, 1916, were as follows: Real estate, buildings, tools and fixtures, \$56,797; track and roadway construction, \$19,228; electric line construction, \$3,454, and cars and electrical equipment of cars, \$12,033; total, \$91,513.

From July 1, 1910, to June 30, 1916, there was expended on the property of the company: In maintenance, \$9,912,346; in reconstruction of property paid for out of depreciation reserve, \$5,371,879, and in construction and in betterment and improvements, \$1,528,019; total, \$16,812,246. All of this sum was paid out of the earnings of the property, and none represents money obtained from new capital issues. The total is 22.985 per cent of the gross earnings during those years. The growth of the city has been slow during

that time, and a comparatively small sum has been necessary for additional tracks and equipment. If St. Louis had grown as it did previous to that time, the report states, the earnings would not have sufficed to enable the railway to keep pace with the growth of the city.

Sooner or later, it is hoped, business conditions in St. Louis will improve, and the accompanying growth in population will require large additional capital expenditures for tracks, cars, car storage, substations, feeders and other new and additional equipment. Moreover, between the present date and October, 1924, bonds mature to the extent of \$27,448,000. The probable construction demands in the near future and these maturing bond issues, together with the burden of increased taxes, make the amounts of money available from earnings inadequate for these purposes. How these maturing bonds may be taken care of and how this additional capital may be raised is a matter of anxious concern which the management is presently considering and, it promises the stockholders, will continue to consider in the expectation of a timely solution of the problem.

The report reviews in detail the history of the mill tax litigation, which last May was finally decided against the company as to taxes from 1903 to 1910, amounting with interest to \$1,839,205. This sum was paid on June 16. The taxes from 1910 to the present time amount, with interest, to approximately \$1,500,000. No judgments have been obtained for these taxes, although suits have been filed by the city and will probably come up for trial this autumn. The report states that in justice to the interests of the stockholders, the board of directors has always felt that it was in duty bound to resist the payment of a tax which it considers excessive and illegal.

## Lima Light, Power &amp; Tramways Company

The operations of the Empresas Eléctricas Asociadas (Lima Light, Power & Tramways Company), which holds practically a monopoly of the electric railway, power, and light in Lima, Callao, and several of the suburban towns in Peru, showed a small general decrease for 1915. The bonds of this company are largely held in London, but there is also considerable local and American capital invested in it. The net profits for 1915, after setting aside the sum of \$141,129 for the amortization account and writing the sum of \$204,393 off the books against bad debts, etc., amounted to more than \$145,950, but owing to the agreement made with the bondholders in London whereby the amortization service on the bonds was suspended from June 30, 1914, for a period of two years, no dividends may be distributed from profits during this period.

The gross income for 1915 amounted to \$1,880,035 as compared to \$1,913,469 for 1914, a decrease of \$33,434. Of this amount \$836,045 represents the cost of operation during 1915, as compared to \$804,233 in 1914, an increase of \$31,812.

The gross revenues of the urban and interurban tramways in 1915 amounted to \$997,641 as compared to \$997,712 in 1914, a decrease of \$71. The cost of operation amounted to \$614,154 as compared to \$585,465 in 1914, an increase of \$28,689. The net revenue amounted to \$383,487 as compared to \$412,246 in 1914, a decrease of \$28,759. These figures represent the Lima Urban Tramway, the line from Lima to Chorillos, the Lima-Callao and Magdalena tramways. The net revenues showed a decrease in all cases except the Magdalena line, on which there was a net increase of \$8,059.

The gross revenues from freight traffic in 1915 amounted to \$131,371 as compared to \$173,971 in 1914, a decrease of \$42,600. The running expense in 1915 amounted to \$146,244, as compared to \$164,223 in 1914, a decrease of \$17,979. The net loss in 1915 was \$14,873, a decrease of \$24,620. No section of the company's service suffered a greater commercial depression than the freight lines during the last year, owing to the paralysis of the maritime movement and the decrease in the volume of imports at the port of Callao.

The total length of the company's lines is 136 kilometers. The number of interurban cars in operation was fifty-two, of urban cars seventy-five. This company uses large quantities of American electrical equipment and goods, and most of the new cars installed in recent years have been of American manufacture, especially the modern high-power cars on the suburban lines.



## ELECTRIC RAILWAY STATISTICS

## Returns for First Half of 1916 and 1915 Show Increased Expenses and Taxes But Higher Net

A comparison of electric railway statistics for the six months, January-June, 1916, with figures for the corresponding months of 1915, made by the information bureau of the American Electric Railway Association, indicates a noticeable improvement in the electric traction business of the United States. Data for the six months representing 7444 miles of line of companies scattered throughout the country show an increase in operating revenues of 8.08 per cent, in operating expenses of 5.68 per cent, and in net earnings of 12.10 per cent, while data representing 6391 miles of line indicate an increase in taxes of 6.58 per cent, and in operating income of 13.09 per cent. The number of revenue and transfer passengers carried by companies rep-

TABLE I—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
	Amount	Per Cent Increase	Amount	Per Cent Increase
<i>United States*</i>				
Operating revenues.....	\$17,683,491	9.43	\$14,655,069	8.53
Operating expenses.....	10,753,952	4.98	9,047,654	4.50
Net earnings.....	6,929,539	17.14	5,607,415	15.71
Taxes.....	.....	.....	1,006,379	16.63
Operating income.....	.....	.....	4,601,036	15.51
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	63.39	.....	64.11	.....
1916.....	60.81	.....	61.74	.....
Miles of line represented.	7,444	.....	5,955	.....
<i>Eastern District*</i>				
Operating revenues.....	\$12,712,800	11.40	\$9,947,131	10.53
Operating expenses.....	7,661,574	6.56	6,129,928	6.28
Net earnings.....	5,051,226	19.64	3,817,203	18.10
Taxes.....	.....	.....	656,928	21.71
Operating income.....	.....	.....	3,160,275	17.38
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	63.00	.....	64.09	.....
1916.....	60.27	.....	61.62	.....
Miles of line represented.	4,726	.....	3,481	.....
<i>Southern District*</i>				
Operating revenues.....	\$793,311	7.07	\$589,579	5.59
Operating expenses.....	460,024	2.19	328,647	0.67
Net earnings.....	333,287	14.63	260,932	14.70
Taxes.....	.....	.....	49,270	9.43
Operating income.....	.....	.....	211,662	16.00
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	60.76	.....	59.26	.....
1916.....	57.99	.....	55.74	.....
Miles of line represented.	689	.....	533	.....
<i>Western District*</i>				
Operating revenues.....	\$4,177,380	4.28	\$4,118,359	4.38
Operating expenses.....	2,632,354	1.11	2,589,079	1.16
Net earnings.....	1,545,026	10.16	1,529,280	10.31
Taxes.....	.....	.....	300,181	7.93
Operating income.....	.....	.....	1,229,099	10.90
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	64.99	.....	64.86	.....
1916.....	63.01	.....	62.87	.....
Miles of line represented.	2,029	.....	1,941	.....

NOTE—Letter d denotes a decrease.

\*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of the Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

resenting 6587 miles of line increased 7.21 per cent, while the revenue car mileage increased 3.32 per cent. The Western District seems to share but little in the improved business conditions of the other sections of the country.

Of the three groups shown on Table II, the Western, represented by 2029 miles of line, shows an increase in operating revenue of 3.97 per cent, in operating expenses of 3.45 per cent and in net earnings of 4.94 per cent. Returns for about 97 per cent of this mileage show an increase in the amount of taxes paid of 5.07 per cent and in operating income of 4.94 per cent.

The Southern group, represented by 689 miles of line, shows an increase in operating revenue of 7.18 per cent, in operating expenses of 1.83 per cent and in net earnings of 15.82 per cent. Returns, however, for about 75 per cent of this mileage indicate a decrease in operating expenses of 1.37 per cent and increases in taxes of 9.52 per cent and in the operating income of 12.53 per cent.

The Eastern group, represented by 4726 miles of line or about 60 per cent of the total mileage, indicates an in-

TABLE II—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
	Amount	Per Cent Increase	Amount	Per Cent Increase
<i>United States</i>				
Operating revenues.....	\$100,582,214	8.08	\$96,527,216	8.00
Operating expenses.....	61,644,132	5.68	59,099,293	5.66
Net earnings.....	38,938,082	12.10	37,427,923	11.91
Taxes.....	.....	.....	6,460,469	6.58
Operating income.....	.....	.....	30,967,454	13.09
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	62.68	.....	62.58	.....
1916.....	61.29	.....	61.22	.....
Miles of line represented	7,444	.....	6,391	.....
<i>Eastern District</i>				
Operating revenues.....	\$71,515,049	9.61	\$69,063,491	9.69
Operating expenses.....	43,106,096	6.78	41,640,646	6.87
Net earnings.....	28,408,953	14.22	27,422,845	14.28
Taxes.....	.....	.....	4,389,185	7.01
Operating income.....	.....	.....	23,033,660	15.78
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	61.88	.....	61.89	.....
1916.....	60.27	.....	60.29	.....
Miles of line represented	4,726	.....	3,917	.....
<i>Southern District</i>				
Operating revenues.....	\$4,603,197	7.18	\$3,362,416	3.91
Operating expenses.....	2,703,059	1.83	1,899,210	d1.37
Net earnings.....	1,900,138	15.82	1,463,206	11.67
Taxes.....	.....	.....	295,663	9.52
Operating income.....	.....	.....	1,167,543	12.23
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	61.80	.....	59.51	.....
1916.....	58.72	.....	56.48	.....
Miles of line represented	689	.....	533	.....
<i>Western District</i>				
Operating revenues.....	\$24,463,968	3.97	\$24,101,309	3.98
Operating expenses.....	15,834,877	3.45	15,559,437	3.44
Net earnings.....	8,629,091	4.94	8,541,872	4.97
Taxes.....	.....	.....	1,775,621	5.07
Operating income.....	.....	.....	6,766,251	4.94
Operating ratio, per cent:	.....	.....	.....	.....
1915.....	65.05	.....	64.89	.....
1916.....	64.73	.....	64.55	.....
Miles of line represented.	2,029	.....	1,941	.....

NOTE—Letter d denotes a decrease.

crease in operating revenue of 9.61 per cent, in operating expenses of 6.78 per cent and in net earnings of 14.22 per cent. Returns representing about 83 per cent of this mileage show an increase in the amount of taxes paid of 7.01 per cent and in operating income of 15.78 per cent.

On the whole the number of passengers carried has increased, as has the number of revenue car miles run. While the Eastern District shows an increase of 8.35 per cent in the number of passengers carried and one of 3.40 per cent in the number of car miles run, the Southern shows an increase of 11.23 per cent in the number of passengers and an increase of 5.66 per cent in the number of car miles. The increases in the Western district have been the smallest of the three groups shown—the number of passengers increasing but 4.41 per cent and the number of car miles run 2.81 per cent. All of the districts show a decrease in the operating ratio, the United States as a whole indicating a decrease from 62.68 in 1915 to 61.29 in 1916. The operating ratio of the Western district is higher than those of the other districts and has decreased least of all.

The returns for June shown in Table I indicate a considerable improvement over a similar comparison for the

TABLE III—TRAFFIC AND OPERATING STATISTICS OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Revenue and Transfer Passengers		Revenue Car Mileage		Miles of Line Represented	Operating Revenues Per Revenue Car Mile (cents)*		Operating Expenses Per Revenue Car Mile (cents)*		Net Earnings Per Revenue Car Mile (cents)*	
	Amount†	Per Cent Increase	Amount†	Per Cent Increase		Amount	Per Cent Increase	Amount	Per Cent Increase	Amount	Per Cent Increase
United States.....	2,026,275	7.21	277,380	3.32	6,587	28.99	4.02	18.50	1.98	10.49	7.81
Eastern district.....	1,342,134	8.35	176,881	3.40	4,214	30.40	5.34	19.29	2.71	11.11	10.22
Southern district.....	66,782	11.23	13,154	5.66	413	21.51	3.86	13.48	d2.67	8.03	17.05
Western district.....	617,359	4.41	87,345	2.81	1,960	27.27	1.30	17.67	1.03	9.60	1.80

NOTE—Letter d denotes a decrease. †The last three figures are omitted.

\*The figures in these columns are based upon the revenue car mileage shown in this table. As some of the companies reporting do not show car mileage, however, the returns from those only showing both car mileage and revenues, expenses, etc., have been used in arriving at the above shown figures.



previous month, though, of course, they are not strictly comparable because of the difference in the miles of line represented. Table III shows that the net earnings per revenue car mile for the United States as a whole have increased 7.81 per cent, while those of the Western District have increased but 1.80 per cent. Companies numbering 104 reported for Table II.

**American Railways, Philadelphia, Pa.**—Bioren & Company, Philadelphia, Pa., are offering at prices to yield 5 per cent and 5½ per cent \$140,000 of car trust 5 per cent certificates Series C issued by the American Railways under the Philadelphia plan. The certificates are dated Aug. 1, 1916, and mature \$11,000 on Aug. 1, 1917, to 1920, inclusive, and \$12,000 on Aug. 1, 1921, to 1928, inclusive.

**Brockton & Plymouth Street Railway, Brockton, Mass.**—The directors of the Brockton & Plymouth Street Railway voted to defer the payment of the semi-annual dividend of \$3 per share, normally payable on Sept. 15, on the cumulative preferred stock of the company.

**Connecticut Company, New Haven, Conn.**—Clark, Dodge & Company, New York, N. Y., and Hartford, Conn., are offering for subscription \$460,000 of Connecticut Company 4½ per cent gold equipment notes, dated Sept. 15, 1916, and due \$46,000 semi-annually March 15 and Sept. 15, 1917 to 1921. The trustee of the indenture securing the notes is the Security Trust Company, Hartford.

**Kansas City (Mo.) Railways.**—The directors of the Kansas City Railways have authorized the trustees of the company to pay 2½ per cent on the preferred beneficial certificates of the Kansas City Railways. The dividend will be paid on Oct. 1, which puts the preferred beneficial certificates on a 5 per cent basis, as it is expected that another 2½ per cent dividend will be declared in six months.

**United Railways, St. Louis, Mo.**—A committee of stock holders of the United Railways of St. Louis has created an independent proxy committee for the purpose of trying to get representation on the board of directors. The members of the proxy committee are August Heckscher, New York; Charles S. Farnum, Philadelphia, and Ephraim Caplan, St. Louis. The committee has sent letters to all stockholders of the company, asking them to sign proxies authorizing the committee to make such investigations and take such action as may be necessary.

**Toledo Traction, Light & Power Company, Toledo, Ohio.**—Assents representing more than 75 per cent of the \$6,738,500 outstanding preferred and \$7,821,900 outstanding common stocks of the Toledo Traction, Light & Power Company having been received by Henry L. Doherty & Company, depository, by Sept. 15, the plan for exchange into Cities Service Company stocks was duly declared operative. The first dividend on the Cities Service securities issued in the exchange will be the regular monthly one on Nov. 1.

**Public Service Corporation of New Jersey, Newark, N. J.**—Stockholders of the Public Service Corporation of New Jersey of record Oct. 2 will have the right to subscribe to \$5,000,000 of new stock at par. Negotiable certificates of allotment, authorizing subscriptions to the extent of 20 per cent of present holdings, will be sent out to stockholders on Oct. 6. The stock taken may be paid for by Jan. 2, when the stock will become entitled to dividends, or by Nov. 1, in which event 5 per cent interest to Dec. 31 will be given. Recently stockholders ratified an increase of \$25,000,000 in the company's capital stock and the issue about to be made, which will raise the amount outstanding to \$30,000,000, is part of the enlargement.

**Youngstown & Suburban Railway, Youngstown, Ohio.**—The Youngstown & Suburban Railway has been authorized by the Ohio Public Utilities Commission to issue its common capital stock of the par value of \$350,000, its 6 per cent cumulative preferred capital stock of the par value of \$500,000 and its first mortgage 5 per cent twenty-year gold bonds of the principal sum of \$700,000, the stock and bonds to be delivered to J. W. Blackburn, acting for and on behalf of the bondholders' protective committee of the Youngstown & Southern Railway. The securities are to be delivered in payment for the property heretofore owned and operated by the Youngstown & Southern Railway and purchased at judicial sale by Mr. Blackburn on behalf of the

bondholders' protective committee, for the payment by Mr. Blackburn of the floating indebtedness of the Youngstown & Southern Railway, with interest to Oct. 1, 1916, \$136,000; for the payment of the indebtedness to the International Trust Company, Boston, Mass., with interest to Oct. 1, 1916, \$26,000; for expenses and allowances to the bondholders' protective committee, \$10,000; and for additions, extensions and improvements costing approximately \$30,000.

#### DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¼ per cent, preferred.  
Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.  
Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¼ per cent, preferred.  
Cleveland (Ohio) Railway, quarterly, 1½ per cent.  
Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred Series A.  
Eastern Power & Light Company, New York, N. Y., quarterly, 1¼ per cent, preferred.  
Halifax (N. S.) Electric Tramways, quarterly, 2 per cent.  
Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.  
Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred.  
Illinois Traction Company, Peoria, Ill., quarterly, 1½ per cent, preferred.  
Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1½ per cent.  
New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, common and preferred.  
Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.  
Philadelphia Company, Pittsburgh, Pa., \$1.50 on 6 per cent preferred; quarterly, 87½ cents, common.  
Toronto (Ont.) Railway, quarterly, 2 per cent.  
Washington, Baltimore & Annapolis Electric Railroad, Washington, D. C., quarterly, 1½ per cent, preferred.  
Western Ohio Railway, Lima, Ohio, quarterly, 1¼ per cent, first preferred.

#### ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '16	\$209,030	\$129,436	\$79,594	\$36,117	\$43,477
1 " " '15	187,488	120,725	66,763	36,531	30,232

#### BROCTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., July, '16	\$15,256	\$9,795	\$5,461	\$1,109	\$4,352
1 " " '15	15,348	8,457	6,891	1,185	5,704
12 " " '16	118,790	102,389	16,401	13,244	3,157
12 " " '15	118,618	98,264	20,354	13,585	6,769

#### CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., July, '16	\$32,858	\$19,171	\$13,687	\$6,559	\$7,128
1 " " '15	31,319	17,666	13,653	6,602	7,051
12 " " '16	383,240	224,907	158,333	78,568	79,765
12 " " '15	338,022	206,228	131,794	78,803	52,991

#### PENSACOLA (FLA.) ELECTRIC COMPANY

1m., July, '16	\$20,964	\$12,076	\$8,888	\$7,712	\$1,176
1 " " '15	21,940	12,626	9,314	7,123	2,191
12 " " '16	276,272	153,426	122,846	89,311	33,535
12 " " '15	246,080	150,518	95,562	86,948	8,614

#### PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Aug., '16	\$2,149,836	\$1,223,473	\$926,363	\$815,011	\$111,352
1 " " '15	1,897,763	1,086,744	811,019	815,941	14,922
2 " " '16	4,364,765	2,444,948	1,919,817	1,630,279	289,538
2 " " '15	3,837,669	2,182,439	1,655,230	1,632,538	22,692

#### REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., Aug., '16	\$335,578	\$183,147	\$152,431	\$72,436	\$82,371
1 " " '15	260,792	158,289	102,503	56,922	45,725
8 " " '16	2,596,204	1,523,451	1,072,753	555,831	162,168
8 " " '15	1,968,618	1,218,582	750,036	446,846	1304,262

#### SAVANNAH (GA.) ELECTRIC COMPANY

1m., July, '16	\$69,445	\$45,193	\$24,252	\$23,705	\$547
1 " " '15	67,284	44,305	22,979	23,275	1296
12 " " '16	791,697	532,425	259,272	280,073	120,801
12 " " '15	806,732	522,568	284,164	277,688	6,476

#### TAMPA (FLA.) ELECTRIC COMPANY

1m., July, '16	\$74,625	\$41,162	\$33,463	\$4,396	\$29,067
1 " " '15	78,979	41,456	37,523	4,364	33,159
12 " " '16	970,873	519,362	451,511	52,287	399,224
12 " " '15	982,095	504,183	477,912	52,744	425,168

\*Includes taxes. †Deficit. ‡Includes non-operating income.



## Traffic and Transportation

### INSURANCE FOR HUDSON TUBE EMPLOYEES

Hudson & Manhattan Railroad, Operating Under River Tunnels, Announces Terms of Group Insurance for Employees

In recognition of the faithful and loyal services of the officers and employees of the Hudson & Manhattan Railroad, New York, N. Y., and for the purpose of furthering the common interests of the company and its employees, the directors upon the recommendation of the president, have approved a plan of life insurance for the benefit of those employees who while in the company's service may die or become totally disabled. This life insurance supersedes the employees' death benefit fund, and became effective on Sept. 1, 1916. The general features of the life insurance plan are as follows:

1. The premium to be paid by the company, making the insurance without cost to the employees.

2. Every employee in the service on Sept. 1, 1916, is included in the plan.

3. All employees who on Sept. 1, 1916, have been continuously in the company's service three years or longer are included for full benefits as follows:

(a) Employees receiving rates of wages of \$2.51 or over a day, are insured for the amount of \$1,000.

(b) Employees receiving rates of wages of \$2.01 to \$2.50 a day, are insured for the amount of \$750.

(c) Employees receiving rates of wages of \$2 or less a day, are insured for the amount of \$500.

4. All employees who on Sept. 1, 1916, have been continuously in the company's service less than three years are included for half benefits as follows:

(a) Employees receiving rates of wages of \$2.51 or over a day, are insured for the amount of \$500.

(b) Employees receiving rates of wages of \$2.01 to \$2.50 a day, are insured for the amount of \$375.

(c) Employees receiving rates of wages of \$2 or less a day, are insured for the amount of \$250.

5. All employees who are now entitled to half benefits will automatically become entitled to full benefits as soon as their three years of service are completed.

6. New employees entering the company's service after Sept. 1, 1916, will be required to complete one year's full service before they become entitled to participate in this life insurance plan. After having served one full year, such employees will be entitled to half benefits during the next two years of service, and having completed three full years of service (one year without benefits plus two years with half benefits), such employees will automatically become entitled to full benefits under the insurance plan as it has been decided upon.

7. All employees in the service on Sept. 1, 1916, will be included in the life insurance plan whether for full benefits or for half benefits, without any medical examination. As to new employees entering the service after Sept. 1, 1916, the regular physical examination by the company's medical officer will be accepted as sufficient medical examination under the insurance plan.

8. With the approval of the company, and contingent upon loyal service, employees may take out additional insurance at their own expense equal to that for which they are insured by the company. This additional insurance will be granted without further medical examination and at the same group rates paid by the company. Upon favorable terms still larger amounts of insurance may be secured by any employee who may desire it.

9. If and when any employee for any cause leaves the company's service all insurance benefits cease and terminate; but with the approval of the company, and contingent upon loyal service, employees when leaving the service may convert their policies secured under this life insurance plan into regular life or endowment policies without further medical examination and at the customary rates for this class of insurance sick.

### NEW JITNEY RULES FROM MARYLAND

The Public Service Commission of Maryland has drawn up a new set of rules for jitney buses, to become effective on Oct. 1, in place of the regulations issued on June 19, 1915. The new rules are designed not merely to control the jitney traffic, but to standardize it so far as possible. The rules provide that no motor car may be used in the public transportation of persons or freight until a permit shall have been obtained from the commission. Every permit, no matter when issued, shall terminate as of Dec. 31 following. The commission may specify in the permits the rates that are to be charged and may require the owners to post in the cars a schedule of such rates.

No motor car for which a fixed route or a fixed schedule has been made shall vary from it without the permission of the commission, except in emergency. All cars operating over fixed routes, or between fixed terminals, shall carry destination signs, which shall indicate the terminals or the streets which form the greater part of the route.

Cars operated for hire other than over a fixed route shall carry a sign designating them as "hiring cars." They may not operate over the fixed route of any other jitney or jitney concern, nor solicit passengers or freight along any fixed route without being required to obtain from the commission permits as buses engaged in traffic over fixed routes.

Not more than one person, in addition to the driver, shall be permitted to occupy the front seat; no passenger shall be permitted to ride on the steps or running board, and no person shall ride on the top unless it has been constructed for such use and is equipped properly with seats and rail protection.

Cars may not carry more than one passenger for each 16 in. of seating space, and that allowance per passenger is conditioned upon an average weight of not more than 140 lb. per passenger. The commission states in the rules the following as the greatest loads that may be carried:

Total length seats.	128	140	166	176	192	208	234	240
Pounds capacity...	1,120	1,260	1,400	1,540	1,680	1,820	1,960	2,150
Number passengers.	8	9	10	11	12	13	14	15

The rules further provide that accidents and interruptions to service must be reported to the commission; that owners of jitneys may not withdraw them from service without at least ten days' notice to the commission; that sufficient reserve equipment must be kept to maintain service on fixed routes and schedules, and that jitneys must be kept in such condition that adequate service will be rendered and the public and passengers not endangered by avoidable breakdowns.

### REASONS FOR FAVORABLE DECISION IN BRISTOL & NORFOLK CASE

In the ELECTRIC RAILWAY JOURNAL of Sept. 9, page 469, reference was made to the authorization of a proposed fare increase to 6 cents on the Bristol & Norfolk Street Railway by an order of the Massachusetts Public Service Commission dated Aug. 31. The decision of the board in this case was based upon a finding that the property is clearly a losing venture; that its physical condition is poor, and that the company is justly entitled to a larger revenue if it can be secured. In 1914 the road failed to earn operating expenses by \$2,077, and in 1915 by \$539. The commission finds that as the owners have abandoned the track formerly belonging to the Easton Street Railway, the former are not entitled to a return upon the capitalization representing the portion so abandoned, but allowance for this makes no difference in the company's being entitled to additional revenue. The company operates only 6.696 miles of single track, of which it owns 6.318 miles. Its capital stock totals \$100,000, the funded debt being \$70,000; unpaid interest totals \$42,000, and there is a profit and loss deficit of \$54,925. The road at present runs from Stoughton Square to Randolph, and the combined population served was only 12,223 in 1915. In the thirteen fiscal years from 1903 to 1915 inclusive the company failed to earn its fixed charges.

Practically the only objection raised by the remonstrants was to the elimination of a special arrangement under which a lower fare is granted to workmen at certain hours of the day. The company proposed to increase this fare from



5 cents to 12 cents, and the commission pointed out that this might lay a heavy burden upon certain families. The company showed that only seventy to seventy-five persons a day avail themselves of this special rate. The decision says:

"While the commission doubts its authority to require the company to maintain special reduced rates similar to those now in force, it feels that the company, in the exercise of sound discretion in management, ought to consider very carefully the change which is proposed. The result, if this policy is carried out, might well be to compel certain families to change their place of residence, so that the actual net gain for the company would be insignificant. We strongly urge the company to consider the desirability of a less radical change. An increase in the present rate during these hours from 5 to 7 cents would, we think, be likely to produce better results for the public and the company."

**Hearing on Berkshire Operation.**—The Massachusetts Public Service Commission has assigned Oct. 3 as the probable date for a hearing upon the petition of the towns of Westfield, Lee, Huntington and others, urging that the Berkshire Street Railway be compelled to inaugurate service over the entire line lately completed between Lee and Huntington. At present service is rendered from Lee to a point in Otis.

**Get Passengers to Unfold Their Transfers.**—The Portland Railway, Light & Power Company, Portland, Ore., has effected a notable saving of conductors' time by requesting passengers to unfold their transfers before presenting them on entering the prepayment type cars. The request has been made through *Watts Watt*, the company's weekly leaflet which conductors hand out to passengers. Evidence that passengers read and heed is given by the fact that conductors report much more attention to this detail, and in some instances passengers have commented on the notices which appeared requesting it.

**Jitney Men Comply with Wilkes-Barre Ordinance.**—Convinced that the only way jitneys can operate in Wilkes-Barre, Pa., is to meet full requirements of the jitney ordinance, eleven men who have been engaged in the business since the strike of the employees of the Wilkes-Barre Railway, filed the required \$2500 bond on Sept. 13, had their cars inspected and underwent physical examinations as the first step in restoring jitney travel. Other jitney men are expected to comply with the ordinance, now that it has been definitely determined that Council will not revise or repeal the ordinance in part or in whole.

**Owl Traffic Falls Off When State Goes Dry.**—On fourteen lines of the Portland Railway, Light & Power Company, Portland, Ore., which serve residence districts of the city, there has been a material decrease of owl traffic since the prohibition law went into effect. This decrease has ranged from 24 to 31 per cent, according to the class of district involved, the average being 28 per cent. This has been accompanied by a slight increase of traffic in the late evening hours. One explanation offered is that the 28 per cent of owl car patronage was saloon attendants and patrons who have left the dry town or who now go home early.

**Accident in Pennsylvania Railroad Tube.**—Fourteen persons were injured when two trains tried to enter the single-track westbound tube of the Hudson River tunnel system beyond the Pennsylvania Station in New York at the same time on Sept. 16. It was the first accident to happen at the Pennsylvania Station since it was opened six years ago, and the first serious mishap the Pennsylvania has ever had with its tube operation. The Washington Express started out at 10.08 o'clock. It consisted of an electric locomotive and six cars. Two minutes later electric locomotive No. 27 struck the Washington train just between the diner and the first day coach.

**New Traffic Ordinance in Portland, Ore.**—By unanimous vote of the Council of Portland, Ore., a new traffic ordinance has been passed and will go into effect by Oct. 1. The ordinance provides that street cars shall stop at the near instead of far crossing on all paved streets; that no vehicle shall pass either to the right or left of a street car which is standing at an intersection to take on or discharge passengers; that no transparency or sign larger than 36-in. square shall be carried or moved in the downtown streets;

that the speed of automobiles within the congested district shall be not more than 15 m.p.h. and outside this district 20 miles; that fire apparatus and all other emergency vehicles shall be limited in speed to 25 m.p.h.

**Blanket Jitney Grant Wanted.**—S. Chaimov recently petitioned the City Council of Portland, Ore., for a blanket franchise covering the entire city for the operation of jitneys, for a period of twenty-five years. For the first year he is willing to pay the same amount of revenue the city is now receiving from the jitneys; for the second, third, fourth and fifth years, he will increase the amount \$500 a year, and \$1,000 a year for each year up to the tenth. For the next seven and one-half years he agrees to pay \$10,000 and for the rest of the time \$12,000. It is probable that the City Council will consider the application along with the application of the Jitney Drivers' Union, which recently applied for a term franchise.

**Prize Stock Handled at Louisville.**—The Louisville & Interurban Railroad, Louisville, Ky., has closed a considerable amount of desirable business in the way of transportation of high bred live stock from stock farms in Shelby County, some 30 miles out, to the State Fair grounds in Louisville, Ky. A year ago the company transported the show herd of Jerseys from one of the breeding farms near Shelbyville, terminus of one of the country lines. These were all valuable animals and the trip is always dreaded by the owner. Three hours after being loaded, they had been led from the car, and were safe in the show pens. The same time was made on the return trip. This year, without solicitation, the company increased this kind of business on the strength of the Jersey breeder's recommendation, giving a service with which the steam roads could not compete. The shippers did not think it necessary to take out any insurance on the animals handled by electric cars. The usual baggage cars were used for this work, bedded in straw, and a portable chute was used in unloading at the fair grounds.

**Safety Zones Opposed in Buffalo.**—Thomas Penney, general counsel of the International Railway, Buffalo, N. Y., appeared in opposition to the establishment of safety zones in the down-town streets of the city at a hearing before the Commissioner of Public Works. The Automobile Club is fostering a movement to abolish the ordinance which requires all automobiles to stop to the rear of street cars when passengers are boarding or alighting and is urging the establishment of safety zones where passengers may wait for cars. Mr. Penney said that the only question was whether safety zones would facilitate the movement of automobiles or street car traffic. If it was proposed to abolish the present ordinance requiring automobiles to stop to the rear of standing street cars, he objected to the proposed plan. Not a person has been killed in the down-town section since the present ordinance has been effective. Mr. Penney also pointed out that 90 per cent of the traffic on the Buffalo city lines came into the down-town center during the rush hour period because of the peculiar layout of the district and that automobile drivers must be checked from fast driving.

**Decision Reserved in Point Shirley Fare Case.**—The Public Service Commission of Massachusetts has issued a memorandum withholding decision in the petition of patrons of the Boston, Revere Beach & Lynn Railroad for the establishment of a 5-cent fare via the Narrow Gauge line and Point Shirley Street Railway, between Rows Wharf, Boston, and Point Shirley. The Revere Beach company owns the stock of the street railway and a motor-car service is operated over the track of the latter in connection with the through train service on the former. The petitioners urged that the service be improved and the rates reduced. The commission notes that the company has given assurances that track defects will be remedied and more reliable service rendered in the coming winter and places this part of the case on file. In view of the fact that the petitioners and the Selectmen of Winthrop were not in agreement at the hearing as to the expediency of reducing the fares on the street railway, the commission has laid the petition upon the table. At the hearing, the Selectmen contended that a reduction in fares would result in a depreciation of real estate value in the territory served.



## CHANGES IN BOSTON PERSONNEL

**Matthew C. Brush Elected President of the Boston Elevated Railway, General Bancroft Becomes Chairman of the Board of Directors**

The directors of the Boston (Mass.) Elevated Railway elected Matthew C. Brush president and a director of the company at a special meeting on Sept. 15. Maj.-Gen. William A. Bancroft, retired, who has been president of the road since 1899, was elected chairman of the board. The change went into effect immediately. Both men have had distinguished careers in the transportation industry. Mr. Brush becomes executive head of the company at the age of thirty-eight, and is one of the most widely-known operating officers in the country. General Bancroft's name has been synonymous with the development of the Boston system from that of horse car days to its present magnitude, and his able administration of the property has earned widespread commendation.

Matthew Chauncey Brush was born in Stillwater, Minn., in 1877. He was graduated from the Armour Institute of Chicago in 1897 and in 1901 from the Massachusetts Institute of Technology. His early work included a broad steam railroad and steamship experience in the Middle West and Great Lakes districts. Mr. Brush served as machinist, foreman and roundhouse foreman for the Union Pacific Railroad at Omaha, Neb.; as purser on Great Lakes steamers, and then as general foreman in charge of shops and roundhouses on the Chicago, Rock Island & Pacific Railroad. Thirteen years ago he entered the street railway field as assistant to the president of the Boston Suburban Electric Companies, with headquarters at Newtonville, soon becoming general manager and vice-president. While connected with this property Mr. Brush was directly in charge of the campaign for the substitution of the present 6-cent fare unit for the 5-cent rate formerly standard on the road, and the success of the general program was important in relation to later developments in this field under the regulative authority of the Massachusetts Public Service Commission.

In 1909 Mr. Brush resigned to become general manager of the Buffalo & Lake Erie Traction Company, the Jamestown, Chautauqua & Lake Erie Railroad, and the Jamestown & Chautauqua Steamship Company, operating 200 miles of electric lines, 50 miles of steam railroad and a fleet of steamboats on Lake Chautauqua, N. Y. In 1910 he entered



MATTHEW C. BRUSH

the service of the Boston Elevated Railway as assistant to the vice-president. In 1911 he became chairman of the company's efficiency committee, and in 1912 was made second vice-president, later being appointed vice-president, in direct charge of the bureau of transportation. Mr. Brush's success in the field of public relations has been fully equalled in the difficult sphere of labor negotiations, and he is an exponent of the policy of entire frankness in dealing with the

public, officials and employees. He has to an unusual degree the capacity for stimulating enthusiastic and loyal service among his subordinates. Mr. Brush takes office at a time when the burdens laid upon the company by the public and by increased costs of operation have become so heavy as to necessitate an inquiry into its financial problems by a special legislative committee, and he has been closely associated with the preparation of the company's case from the standpoint of securing additional net revenue for presentation at forthcoming hearings. Mr. Brush is unmarried. He resides with his mother in Allston. He is a past-president of the New England Street Railway Club and of the American Electric Railway Transportation & Traffic Association; is a member of the Engineers' Club of Boston, the University and City Clubs of Boston, and other organizations.



MAJ.-GEN. W. A. BANCROFT

Chairman Bancroft was born at Groton, Mass., in 1855, and was graduated from Harvard College in 1878. In college he was captain and stroke of the victorious Harvard crews of 1877, 1878 and 1879, and later coached various crews for about five years. After a course at the Harvard Law School he was admitted to the bar and practised law until 1885, when he became superintendent of the Cambridge Horse Railroad, which later absorbed the Charles River Street Railway. In 1887 a strike occurred on the road, which had 600 employees, and with 1600 horses to care for and a staff of only eight persons, he achieved distinction by keeping the cars running except for three days. Later nearly all the striking employees individually admitted that their course was ill-advised. When the West End Street Railway absorbed the street railways of Boston, General Bancroft was appointed roadmaster of the system and superintended the construction of the first electric lines, under the presidency of Henry M. Whitney.

In 1890 General Bancroft resumed the practice of law, and beginning in 1892 served four successive terms as Mayor of Cambridge. At the organization of the Boston Elevated Railway he was made counsel and then vice-president and a director of the company, and upon the retirement of President William A. Gaston he became chief executive. He has been chairman of the executive committee of the board of directors for many years. Under his presidency the system has developed until it has a present investment of about \$116,000,000, 9,000 employees and 520 miles of track. The investment at the beginning of operation was approximately \$26,000,000. The retiring president has long realized the difficulty of meeting the increasing financial burdens imposed upon the company by the public in the shape of investments in new subways and rapid transit lines and has constantly encouraged the use of more efficient operating methods. His appearances before legislative committees and on occasion at commission hearings have been most illuminating to students of the problems of urban transportation. Few executives have given more unstintingly of their time to the properties under their charge. General Bancroft's interest in the physical condition of the system and in the actual handling of its operating problems has been proverbial, and for many years he has devoted virtually seven days a week to the duties of his office, including frequent and comprehensive inspection trips. In the course of his presidency General Bancroft visited numerous cities in Europe and America in the interest of comparing methods on both sides of the Atlantic.

General Bancroft was the only man in the United States at the outbreak of the Spanish-American War to receive a brigadier-general's commission, with the exception of officers of the regular army, active or retired, and of Civil War veterans. His military career began in 1875 as a private in the Fifth Massachusetts Volunteer Infantry, and after passing through the intermediate grades he became Brigadier-Gen-



eral in 1897. In 1898 he was in command of a brigade of volunteer regiments from Illinois, Wisconsin and Iowa, with headquarters at Jacksonville, Fla., and resigned his commission at the cessation of hostilities. He was retired with the rank of Major-General of the Massachusetts Volunteer Militia in 1901.

General Bancroft was chairman of the Republican State Committee in 1893. He is a member of the Order of Cincinnati, Order of Foreign Wars, and Order of the Spanish War. He has been a director of the Boston Chamber of Commerce, and is vice-president of the Chelsea Trust Company, being a director in that organization and also in the Puritan and the United States Trust Companies, Boston. He resides in Cambridge.

In referring to the election of President Brush, the Boston *Herald* said, editorially:

"Other street railway systems have often tried to lure Matthew C. Brush away from the Boston Elevated Railway, with offers of higher salaries. His advance to the presidency of that great company thus comes in fitting recognition, not only of brilliant and faithful work, but of a certain loyalty to Boston and the company with which he has been pleasantly associated since 1909. Congratulations to him and to the public."

## Personal Mention

H. C. Walters, who has been secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., for the last eight or nine years, has resigned to enter the newspaper business.

J. G. Phillips, assistant general superintendent of the Michigan Railway, Jackson, Mich., has resigned. He is succeeded by Horace E. Allen, as mentioned in the *ELECTRIC RAILWAY JOURNAL* Sept. 9.

D. T. Nixon, assistant general manager of the Wisconsin Public Service Company, at Green Bay, has been promoted to the position of general manager of the same company for the properties at La Crosse.

J. R. Empey, superintendent of the Elmira, Corning & Waverly Railroad, Corning, N. Y., has been appointed general manager of that company and of the Corning & Painted Post Street Railway to succeed E. W. Underwood, resigned.

E. W. Underwood, general manager of the Corning & Painted Post Railway and the Elmira, Corning & Waverly Railroad, Corning, N. Y., has resigned to accept the position of superintendent and manager of the Buffalo division of the Erie Railroad at Buffalo, N. Y.

J. A. Wilcox, who has been superintendent and master mechanic of the Corning & Painted Post Street Railway, Corning, N. Y., has been appointed superintendent of power stations and equipment of the Corning & Painted Post Street Railway and the Elmira, Corning & Waverly Railroad at Corning, N. Y.

Ernest Asher has been appointed supervisor of the sixth division of the United Railways, St. Louis, Mo. Mr. Asher was born near Salem, Mo., on July 30, 1886, and worked on his father's farm until March, 1911, when he went to St. Louis and obtained employment with the United Railways as a motorman on the Wellston line. He was frequently appointed to do relief work as a supervisor during the vacation period.

George K. Weeks has resigned from the presidency of the San Francisco-Oakland Terminal Railways, Oakland, Cal., to accept the position of president of the National City Company of California, organized to succeed N. W. Halsey & Company, investment bankers, in California. Mr. Weeks will remain on the directorate of the railways company and on the executive committee of the board. His successor as president of the railway has not yet been named.

C. E. Lenhart has been appointed master mechanic of the London & Port Stanley Railway, London, Ont. Mr. Lenhart has been engaged in electric railway work since 1888. Among the electric railways with which he has been con-

nected are the Fitchburg & Leominster Street Railway, Fitchburg, Mass.; Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Lehigh Valley Transit Company.

John P. Rice has been appointed superintendent of the fourth division of the United Railways, St. Louis, Mo. Mr. Rice was born in St. Louis on Feb. 5, 1867. He entered the service of the United Railways as a conductor on the Cherokee line in 1897. After five years on this run he was appointed foreman of the Jefferson and Geyer carhouse. Two years later, desiring to be outdoors more of the time, he obtained a transfer, being appointed a supervisor. At first he was stationed on his old line, the Cherokee, later on the Bellefontaine, and in 1901 he went to the Wellston, where he remained until his appointment to succeed Superintendent Leslie, deceased, of the Broadway. After his elevation to supervisor, Mr. Rice, during his spare time, "broke in" as a motorman.

Roy Clark, formerly general foreman of the shops of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind., has been appointed master mechanic at the shops of the Michigan Railway at Kalamazoo, Mich. Mr. Clark began work in the electric railway field in 1901 as division master mechanic in the shops of the Union Traction Company of Indiana at Tipton. He continued in this company's employ for four and a half years, and since that time has held similar positions with the Chicago & Milwaukee Electric Railroad; Indianapolis, Columbus & Southern Traction Company; Indianapolis, Crawfordsville & Western Railway; Chicago, South Bend & Northern Indiana Traction Company, and the Terre Haute, Indianapolis & Eastern Traction Company where he served for five years.

Charles S. Thrasher has been elected president of the Youngstown & Ohio River Railroad, Leetonia, Ohio, to succeed Will Christy, deceased. Mr. Thrasher has been connected, for a number of years, in an official capacity with the Cleveland Construction Company, founded by Mr. Christy in the early nineties. The company so formed was a pioneer in the engineering and construction of interurban electric railroads and designed, built and equipped several hundred miles of electric railway throughout the country. Mr. Thrasher was connected with the construction of the Richmond & Petersburg Electric Railroad, the Western Ohio Railroad, the Springfield & Xenia Railway and the Mesaba Railway, and had full charge of the construction of the electric properties on Long Island, known as the New York & Long Island Traction System. After completion of the construction of the Long Island properties, he had charge of the operation of the lines as vice-president and general manager, until they were sold to the Pennsylvania Railroad interests. On his return to Ohio from Long Island, Mr. Thrasher took charge of the construction of the Youngstown & Ohio River Railroad, and since its completion, as secretary and treasurer of the company has directed its operation under Will Christy, the president, whom he now succeeds. Mr. Thrasher was appointed receiver of the properties of the Interurban Railway & Terminal Company, Cincinnati, on Oct. 1, 1914, and has reconstructed the property, under receivership, and directed its operation since that date. In addition he is an officer and director of the Springfield & Xenia Railway and in charge of operation, and is an officer and director of the Warren Bicknell Company, Cleveland, Ohio, operating managers of several interurban electric properties in various States.

## OBITUARY

Charles E. Thomas, master mechanic for the Connecticut Company at Waterbury, Conn., died at the Waterbury Hospital on Sept. 12 after an illness of several weeks. Mr. Thomas was forty-seven years of age. He was a native of Maryland. He had long been engaged in electric railway work and for a number of years was connected with the street railway systems in New York City. In 1905 he entered the employ of the Connecticut Company and was assigned to lines of that company at Pittsfield, Mass. He remained in Pittsfield two years and in 1907 was transferred to Waterbury as master mechanic of the lines centering in that city. Mr. Thomas is survived by his widow and three children, the oldest of whom is fifteen years of age.



## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

### FRANCHISES

**St. Cloud, Fla.**—The citizens of St. Cloud have voted to grant a franchise in St. Cloud to the Central Florida Interurban Railway. William Hall, St. Cloud, secretary. [Aug. 26, '16.]

**Cumberland, Md.**—The Cumberland Electric Railway has received a franchise from the Council to extend its line to the western end of the city limits, reaching a new residential section.

**New Lebanon, N. Y.**—The Albany Southern Railroad has received a franchise from the Council to supply electricity to the town of Lebanon. This extension will carry the company's system to the Massachusetts line.

**Amanda, Ohio.**—The Scioto Valley Traction Company has asked the Council for a twenty-five year franchise to supply electricity in Amanda. The company also proposes to furnish electricity to farmers residing along the line.

**Honey Brook, Pa.**—Application to the City Council for a franchise in Honey Brook has been made by the promoters of the proposed line from Modena to Coatesville. A franchise has been granted by the Council of Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

### TRACK AND ROADWAY

**Montgomery Light & Traction Company, Montgomery, Ala.**—It is reported that this company will construct a line from Montgomery to Wetumpka if a bridge is built across the Tallapoosa River near Hughes' Ferry and a trolley line is permitted to be run across it. The line would connect with the Pickett Springs line and extend ten miles from Pickett Springs. The proposed line would cost about \$100,000.

**Municipal Railway of San Francisco, San Francisco, Cal.**—Plans are being considered by the Board of Supervisors for the construction of an extension along Army Street from Church to Third Street, thence over a street yet to be laid to Hunter's Point.

**Vincennes (Ind.) Traction Company.**—The Indiana Public Service Commission has entered an order dismissing the petition of the Vincennes Traction Company in which the company asked for permission to change its track on Seventh Street, Vincennes, from double track to single track. Charles A. Edwards, a member of the commission, stated that the situation is one for the courts to decide, as it hinges on the interpretation of the contract between the city and the company.

**Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.**—Surveys are being made by the engineers of the Kansas City, Kaw Valley & Western Railway for its proposed extension to Topeka.

**Bay State Street Railway, Boston, Mass.**—An order has been issued by the Public Service Commission of Massachusetts directing the Bay State Street Railway to extend its line along Varum Avenue as far as Totman Street. The company will reconstruct its tracks on Prospect Street, Methuen, and heavy 8-in. rails will replace those now being used.

**Kansas City (Mo.) Railways.**—An ordinance requiring the Kansas City Railways to build and operate a single-track line on East Twenty-fifth Street from Grand Avenue to Troost Avenue has been signed by Mayor Edwards. The construction of this line is a franchise obligation and it is expected that it will be built immediately.

**Omaha & Council Bluffs Street Railway, Omaha, Neb.**—Work will be begun this fall by the Omaha & Council Bluffs Street Railway on the construction of a line from Twenty-fourth and O Streets to Nineteenth and W Streets. The line will probably be extended to Mandan Park later.

**New York Municipal Railway, Brooklyn, N. Y.**—Bids were opened on Sept. 18 by the Public Service Commission for the First District of New York for the installation of tracks for the new Culver line in Brooklyn. Kaufman & Gorcey, New York, were the lowest bidders at \$103,680.

**Interborough Rapid Transit Company, New York, N. Y.**—The Interborough Rapid Transit Company on Sept. 11, placed in service the new connection between the Grand Central subway station, the Grand Central Railroad station and the Queensboro subway. This connection makes it possible for passengers to transfer between the two lines without going into the street. The new connection has been made possible by the extension of the platform of the Queensboro station some 500 ft. to the west to a point underneath the junction of Park Avenue and Forty-second Street. The Public Service Commission for the First District of New York has approved the award of the contract for the installation of the third-rail on the Queens rapid transit lines by the Interborough Rapid Transit Company to the Thomas Crimmins Contracting Company, New York. The cost of the work will be about \$22,300. The commission has also approved the award of the contract for the installation of the tracks on the Seventh Avenue branch of the Lexington Avenue line to Engel & Hevenor, New York, at \$229,440.

**New York (N. Y.) Connecting Railroad.**—Plans are being prepared by the engineering department of the Pennsylvania Railroad for the installation of an electric switch and signal system for the New York Connecting Railroad. The signal work, it is understood, will be installed by the Pennsylvania Railroad and the New York, New Haven & Hartford Railroad jointly.

**\*Goldsboro, N. C.**—It is reported that plans are being considered for the construction of a line from Goldsboro to Seven Springs, about 14 miles. George Norwood, Goldsboro, is interested.

**Ohio Electric Railway, Springfield, Ohio.**—Under a decision issued by Judge Evans of the Franklin County Common Pleas Court on Sept. 15, the Ohio Electric Railway must cease the use of the wooden trestle over the Norfolk & Western Railroad at Mound Street and use the subway at Main Street. This will necessitate track changes and other construction to cost about \$82,000. The court ruled that the Norfolk & Western Railroad should pay \$53,439 of this amount and the Ohio Electric Railway, \$28,561.

**Youngstown & Southern Railway, Youngstown, Ohio.**—It is reported that a number of improvements will be made by the new owners of the Youngstown & Southern Railway, which was recently sold at public auction to W. J. Blackburn, Youngstown, representing the bondholders.

**Dunville, Ont.**—Announcement has been made that plans for the proposed hydro-radial line from Dunville to Fort Erie are now ready. This proposed line will extend along the lake shore from Danville to Port Colborne, thence to Bridgeburg, via Fort Erie. The municipalities touched by this line will be asked to send each a representative to Toronto shortly when the plans and surveys will be presented, and arrangements made for a series of public meetings, after which the by-laws will be submitted in the various municipalities, probably on the same date as the usual January elections.

**Sudbury, Copper Cliff & Suburban Electric Railway, Sudbury, Ont.**—A report from the Sudbury, Copper Cliff & Suburban Electric Railway states that, owing to war conditions, the extensions contemplated will be postponed.

**Portland & Oregon City Railway, Portland, Ore.**—According to recent reports, work on the Portland end of the Portland & Oregon City Railway, known as the Carver Line, between East Twenty-second and Powell Streets and East Third and Clay Streets, in Portland, is progressing rapidly. The track has been laid from the latter intersection to East Ninth Street and is moving south on East Ninth to Division Street. It is expected that the track will be completed to East Third and Clay Streets by the end of September. This will be the temporary end of the line. At present cars are operated to East Twenty-second and Powell Streets, where connection with the west side is made by auto bus. Condemnation proceedings have been started in the Circuit.



Court by the company to secure possession of a lot located at the southwest corner of East Twenty-second and Division Streets, Portland, belonging to E. M. Lueders and Alfred Lueders. The city of Portland, which is represented to have certain liens on the property as a result of sidewalks, street and sewer assessments, is also made a party to the suit. The company wishes to lay its tracks from the city of Portland southeast into the county of Clackamas, north on East Twenty-second Street, and thence west on Division Street. The lot in question is necessary for tracks.

**Portland Railway, Light & Power Company, Portland, Ore.**—The Interstate Bridge Commission and the Portland Railway, Light & Power Company have reached an agreement whereby the company will be permitted to install a connection with the interstate bridge across the Columbia River, between Vancouver, Wash., and Portland, Ore., from the end of its present Vancouver line, utilizing its old right-of-way and trestle up to the bridge, which is nearing completion. The proposed franchise submitted provides for the construction of new double tracks down the embankment approach to the bridge, a distance of approximately 2 miles. Under the law the franchise must contain a common user clause.

**Coatesville, Pa.**—Rights-of-way are now being secured for the proposed railway to connect Modena and Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

**Schuylkill Railway, Girardville, Pa.**—Plans are being made by this company for the reconstruction of its line in Girardville.

**York (Pa.) Railways.**—Application has been made to the Public Service Commission of Pennsylvania for the approval of the construction, alteration, or re-location of the crossing at the grade of tracks on the Pennsylvania Railroad at West York Avenue. The commission referred the application to the engineering committee of the State. Although West York Avenue, from Philadelphia Street to Linden Avenue, has been double-tracked for several years, there is but one crossing over the railroad tracks. This has often resulted in a tie-up of traffic. The improvements will cost approximately \$7,000.

**Houston, Richmond & Western Traction Company, Houston, Tex.**—It is reported that this company has been reorganized under the name of the San Antonio, Gonzales & Houston Interurban Company. Plans are being made to survey a new route for the proposed line to be built between San Antonio and Houston, about 225 miles. Steeve Holmes, Leesville, Tex., has been elected president to succeed C. C. Godman, Kansas City, Mo. [July 1, '16.]

**San Antonio (Tex.) Traction Company.**—Plans are being made by this company to double-track its line on South Flores Street and to construct 800 ft. of additional spur tracks.

**Virginia Railway & Power Company, Richmond, Va.**—Work will soon be begun by this company on the reconstruction of its track on First Street, from Broad Street to the Northside bridge, and on Floyd Avenue west from the Boulevard.

**\*Portage, Wis.**—Citizens of Portage and Baraboo are interested in the proposed construction of an electric railway to connect Portage and Baraboo. S. H. Peck, Portage, may give further information.

#### SHOPS AND BUILDINGS

**Detroit (Mich.) United Railway.**—Plans are under way by the Detroit United Railway for the construction of a freight terminal to occupy three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street to take the place of the terminal at Congress and Fifth Streets. The estimated cost of the station, including the site, is \$1,000,000.

**New York Municipal Railway, Brooklyn, N. Y.**—The Public Service Commission for the First District of New York has set Oct. 6 as the date for the receipt of bids for the construction of station finish for six stations on the rapid transit railroads now being constructed under the dual contracts. One of the stations is the new diagonal station

on the Lexington Avenue line underneath Forty-second Street beneath Park and Lexington Avenues and which must be completed or substantially completed before the Lexington Avenue line is placed in operation. The other five stations are located on the upper portion of the Seventh Avenue line, as follows: Forty-second Street and Times Square, Pennsylvania Station (Thirty-third Street), Twenty-eighth Street, Twenty-third Street and Eighteenth Street.

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.**—Plans and specifications have been drawn by the Buffalo & Lake Erie Traction Company for the construction of a brick carhouse in Lackawanna. The proposed structure will replace the one now used at East Eagle and Jefferson Streets, Buffalo. The Buffalo carhouse was abandoned by the International Railway Company after the completion of its new Broadway carhouses near the east city line. By using the Buffalo carhouse the Buffalo & Lake Erie Traction Company is forced to operate over International Railway tracks causing considerable delay because of the circuitous route to its Buffalo terminal at Ellicott and Clinton Streets.

**International Railway, Buffalo, N. Y.**—Bids have been asked by the International Railway for the construction of a new concrete and steel passenger terminal in Lockport, to cost approximately \$30,000. The new structure will replace the frame building and will be used by the Buffalo & Lockport, Lockport & Olcott and Buffalo, Lockport & Rochester lines.

**Philadelphia (Pa.) Rapid Transit Company.**—Part of this company's carhouse at Fifty-ninth Street, near Vine Street, was destroyed by fire on Sept. 18. Ten pay-as-you-enter cars were destroyed. The loss is estimated at about \$30,000.

#### POWER HOUSES AND SUBSTATIONS

**Pacific Electric Company, Los Angeles, Cal.**—The power house of the Pacific Electric Company at Upland, which was recently destroyed by fire, is being reconstructed. The new plant will be modern in every particular.

**Madison Light & Railway Company, Madison, Ind.**—This company has entered into a contract with J. C. Reed, representing the Kent Light & Power Company, to supply energy for lamps and motors for the village of Kent and to farmers along the Kent Road. The Madison Light & Railway Company will erect the transmission line.

**Manchester Traction, Light & Power Company, Manchester, N. H.**—Plans are being prepared by this company for the construction of a power plant. French & Hubbard, 88 Pearl Street, Boston, are the engineers.

**Cleveland (Ohio) Railway.**—Fielder Sanders, municipal traction commissioner, has recommended to the City Council that the Cleveland Railway be permitted to contract with the Cleveland Electric Illuminating Company for power. This will result in the abandonment of the Cedar Avenue powerhouse and the construction of a substation, costing \$250,000.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—A contract has been awarded by the Mahoning & Shenango Railway & Light Company to Stone & Webster Engineering Corporation, Boston, for the erection of a high-tension transmission line from the generating station at Lowellville to Sharon, a distance of 14 miles. The wires will be carried on steel towers.

**San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.**—This company, which proposes to construct an electric railway between San Antonio and Houston, will construct an electric power plant. Steeve Holmes, Leesville, president.

**Roanoke Railway & Electric Company, Roanoke, Va.**—This company is preparing to double the output of its plant. The plans provide for the installation of 500-kw. generating units, four new boilers, coal-conveying and handling system, condensers, pumps, etc., the construction of a substation and erection of two 11,000-volt transmission lines to the Viscose Company's plant; also another line when the Viscose Company's plant is completed. The principal contracts have been awarded. The cost of the work is estimated at \$250,000.



## Manufactures and Supplies

### CONDITIONS IN ELECTRICAL MANUFACTURING

Messrs. Rice and Tripp Outline Situation at Edison Illuminating Companies' Convention

At the recent convention of the Edison Illuminating Companies at Hot Springs, Va., E. W. Rice, Jr., president of the General Electric Company, and Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, made addresses describing in an interesting way the situation of those two companies as regards their manufacturing.

According to Mr. Rice, while the volume of business during recent months done by the General Electric Company has shown some recession, orders are still being placed at a rate in excess of anything in the company's previous experience. Promises made by producers of raw material and machinery and tools of every description have been found to be extremely unreliable, and this naturally interferes with the company's schedules of manufacture of finished goods. In Mr. Rice's opinion, there is little if any evidence of any change in the situation in the immediate future, and the company anticipates continued difficulties in obtaining raw materials.

After quoting some of the advances in prices since August, 1914, which the company has had to pay for copper, steel and other materials used in the manufacture of its products, he said that the fundamental difficulty has been the inability to get the materials either on time or in sufficient quantities. Referring to the machine tool market Mr. Rice said prices were constantly raised and deliveries lengthened until some six months ago the most reputable manufacturers began to quote merely nominal current prices subject to an advance not to exceed 20 per cent at the time of shipment. They also informed us that these prices, named for prompt acceptance only, were subject to change without notice.

The increase in prices has not been permitted to directly affect production unfavorably, as these prices have been met. The fundamental difficulty has been the inability to get machinery and materials either on time or in sufficient quantities. In some instances materials and machinery employed heretofore have been unobtainable. New materials, machinery and methods have been substituted, involving delay in production. Even after the company had succeeded in purchasing raw materials, and shipments had actually taken place, Mr. Rice said, there was no assurance that the materials would arrive on time.

The labor situation has also been very unsatisfactory, especially with regard to high-grade skilled employees and low-grade common laborers. There does not seem to be a sufficiency of either class to meet demands. The scale of wages for such employees is abnormally high, and this condition has been intensified by competition for labor among manufacturers. Coincidentally, there is every evidence that efficiency has, temporarily at least, declined, and the output of a man is lower than heretofore.

To a relatively limited extent only have contracts taken for munitions interfered with the company's regular business. If it had anticipated the prompt revival of business it would never have undertaken the manufacture of any munitions. None of the space normally devoted by the company to the manufacture of turbines, induction motors or similar apparatus has been occupied at any time for munitions, and the total space occupied in munition work of all character to-day is but 3 per cent of the company's total manufacturing space, much less than the proportion in value of the munition orders to orders for regular products. The last important order for munitions was taken over a year ago and the company does not now expect to take any further orders of this nature.

In Mr. Rice's opinion, "It would almost seem that the high watermark with respect to prices of raw materials and labor has been reached, and, if so, continuance of such con-

ditions, future prices of raw materials would naturally remain substantially unchanged."

The conditions discussed by Mr. Rice in regard to the difficulties of getting raw materials have also been found by the Westinghouse Company, according to Mr. Tripp. Mr. Tripp said that on Aug. 1, 1914, when the war began, his company had unfilled orders on its books of about \$8,000,000, representing only about two months theoretical full output of its shops. Business continued to dwindle, and on Sept. 28, 1915, which was the lowest point reached, the company had on its books approximately \$5,600,000 of unfilled orders. The real upward movement did not begin until about Nov. 1, 1915, and at the present time, although the company has increased its forces to nearly 30,000, it has on hand to-day unfilled orders for electrical goods amounting to considerably in excess of \$30,000,000.

These figures take no account whatever of orders for war munitions. In June, 1915, the company entered into a contract with the English Government to make rifles for Russia but undertook that work in a plant at Springfield, Mass., and not at its electrical works at Pittsburgh. The company has also undertaken contracts for machining high explosive shells, but while most of this work has been done in the Pittsburgh district it was performed for the greater part in buildings which were not then in use and had not been in use for a long time for electrical manufacture. As other orders were received, the regular workmen of the company who had been engaged on this work were returned to their former employment, and in Mr. Tripp's opinion the labor conditions of the company would have been just as serious as if it had never taken a war order.

Summing up the present problems of the company, he said:

"Our greatest task is to find a sufficient supply of the two extremes, viz., highly-skilled and the common laborer. The first is practically unobtainable and the latter is becoming scarcer, more expensive and less efficient.

"The great source of delay and curtailment of output has for some time been raw material. In July, 1915, our promise of delivery on steel was thirty to sixty days after placing of orders. In September and October these dates were lengthened, and in November promises were three months minimum and four months maximum. At that time we placed orders based on business in hand or in prospect; on Jan. 26, 1916, we received notice that deliveries would be six months, and on Feb. 18, 1916, another notification was received extending delivery to ten months.

"It has only been by constant pressure that we have been able to get material ordered as long ago as October and November, 1915; some of it was received in July this year and some has not yet been shipped. It has been necessary for our purchasing department to put a force of men in the field who live at the mills and endeavor to have our material put through. We have also had a corps of men scouring the country picking up steel wherever they could find it.

"Rubber-covered wire and cable are among some of the other articles the procuring of which has taxed the ingenuity of everybody from the president down."

Mr. Tripp also presented a statement of some of the more important raw materials used by his company and the time required to get them:

Aluminum, sheet meter disks, and meter covers 6 mo.	Porcelain, on dry-process, high-tension pieces, 8 to 12 wk.
Asbestos cloth ..... 16 to 20 wk.	Porcelain, some large and difficult pieces ..... 8 to 12 wk.
Brass rods, tubing and sheets ..... 5 to 6 mo.	Steel drop forgings ..... 120 dys.
Copper rods, sheet and tubing ..... 5 to 6 mo.	Steel shafts, specification No. 1476 ..... 4 to 16 wk.
Copper wire, bare ..... 5 to 6 mo.	Steel shafts, specification No. 1478 ..... 4 to 16 wk.
Cotton-covered magnet ..... 5 mo.	Steel, bare ..... 10 mo.
Silk-covered magnet ..... 5 mo.	Steel plates ..... 10 mo.
Rubber-covered wire and cords ..... 5 mo.	Steel sheets, Bessemer and O. H. ..... 120 dys.
Drills, high speed ..... 5 to 6 mo.	Steel, cold-rolled strip ..... 6 mo.
Drills, standard, carbon 4 to 5 mo.	Steel, tool ..... 4 to 6 mo.
Drills, special ..... 4 to 6 mo.	Steel castings ..... 8 wk.
Emery wheels ..... 5 to 7 mo.	Tapes, asbestos ..... 60 to 90 dys.
German silver, sheet, bare wire, and insulated wire ..... 5 to 6 mo.	Tapes, bias friction ..... 30 dys.
Lamp cord ..... 5 mo.	Tapes, grey webbing ..... 120 dys.
Linen, 0.012 in. .... 60 to 90 days	Tapes, linen, 0.007 in. .... 120 dys.
Porcelain, on wet process, high-tension pieces, 8 to 12 wk.	Tapes, surgical, 0.020 in. .... 120 dys.
	Tapes, taffeta ..... 120 dys.
	Tools, small ..... 12 to 20 wk.

Mr. Tripp said that his company spent more than \$1,000,000 in research and development work next year.



## IMPROVED CAR LIGHTING

## Mazda Lamps in Large Units Have Proved to Be Most Efficient

Most all of the cars, both street and interurban, ordered during the last two years, have been equipped with lighting fixtures arranged in accordance with the better standards for interior illumination. The National Lamp Works of the General Electric Company, Cleveland, have done a vast amount of experimenting and have made many engineering investigations tending toward improvements in lamps suitable for car lighting and toward establishing better standards for car illumination. Compared with the old style methods the greatest improvements are now evidenced by the quite general use of shades and larger wattage Mazda lamps. Practically every road now uses the tungsten lamp in wattages ranging somewhere from 25 to 100 per lamp. Engineers versed in the science of interior illumination point out that it is economy to use shades in car lighting, particularly with high efficiency lamps. By the use of shades a better distribution of the light from large lamps is obtained, and thus in turn power consumption requirements are decreased. Many of the later types of cars are wired for illumination by few large units rather than from a multiplicity of small outlets so commonly used in the older type of cars. The cost of rewiring old cars, however, has been found to be so great that it has prevented the use of large lamps on the old cars of many roads even though the illumination efficiency is higher. Engineers of the National Electric Lamp Works point out that the modern electric railway car has a better installed wiring system and thus with the heavy fittings and shade holders and fewer number of circuits the car lighting circuits give far less trouble and the illumination has a far better effect on the public than the old-style car wiring with its multiplicity of outlets and small carbon lamps.

## PRODUCTION OF STEEL SKELP

As supplementary to the graph showing the increase in production of steel pipe during the last twenty-nine years, published on page 519 last week, the table given below will be of interest. It is from a statistical bulletin issued by the Iron & Steel Institute and shows that the production of wrought iron skelp in this country has decreased not only relatively but actually, while that of steel has increased. Skelp, it may be added, is plate from which pipe is made by bending and welding the edges together and drawing the thick tube thus formed.

PRODUCTION OF IRON AND STEEL SKELP IN THE UNITED STATES  
FROM 1905-1915. GROSS TONS

Year	Iron	Steel	Total	Per Cent	Per Cent
				Iron	Steel
1905	452,797	938,198	1,435,995	31.5	68.5
1906	391,517	1,137,068	1,528,585	25.7	74.3
1907	444,536	1,358,091	1,802,627	24.6	75.4
1908	297,049	853,534	1,150,583	25.8	74.2
1909	370,151	1,663,230	2,033,381	18.2	81.8
1910	350,578	1,477,616	1,828,194	19.2	80.8
1911	322,397	1,658,276	1,980,673	16.3	83.7
1912	327,012	2,119,804	2,446,816	13.3	86.7
1913	312,746	2,189,218	2,501,964	12.5	87.5
1914	264,340	1,718,091	1,982,431	13.3	86.7
1915	262,198	2,037,266	2,299,464	11.4	88.6

## ROLLING STOCK

Mahoning & Shenango Railway & Light Company has ordered ten city cars from the St. Louis Car Company.

Lehigh Valley Transit Company, Allentown, Pa., is reported to be considering the purchase of fifteen cars.

Philadelphia Rapid Transit Company, Philadelphia, Pa., lost ten pay-as-you-enter trolley cars in a fire which damaged part of the Fifty-ninth Street carhouse.

London & Port Stanley Railway, London, Ontario, Can., is reported to be considering the purchase of two cars, which are to be 10 ft. longer than the present equipment.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has ordered from the Russell Car & Snow Plow Company, through Wendell & MacDuffie, one combination ballast car and snow plow.

## TRADE NOTES

National Tube Company, Pittsburgh, Pa., whose plans for a new plant at Gary, Ind., were mentioned in this column recently, reports that the plant will have a capacity of 500,000 tons per year.

The Wendell & MacDuffie Company, New York, which for the past five years has acted as Eastern agents for the St. Louis Car Company, severed its connection with that company on Sept. 15.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., is erecting a reinforced-concrete building, 50 by 100, at their plant No. 2, to take care of the rapidly growing business in its Nigrum impregnated wood bearings.

B. J. Carney & Company, Grinnell, Iowa, reports that William Mueller & Company, 1729 McCormick Building, Chicago, have been appointed sales representatives for Western red cedar poles. Mr. Mueller for a number of years has been connected with the Western Electric Company as manager of the pole department.

McQuay-Norris Manufacturing Company, St. Louis, Mo., reports that Frank J. Stanley, who has been traveling on the Pacific Coast for the company, has been transferred to Cincinnati, Ohio, as manager of its branch there. The company has also added to its sales force by securing the services of John Frier and Max S. Jones, mechanical engineers. They will travel out of the home office.

Ohio Brass Company, Mansfield, Ohio, recently sold to the Boston Elevated Railway, 200 coupler equipments, which will be installed on 100 new center-entrance motor cars to be operated in the East Boston tunnel. These couplers are of the air-connected type and are furnished in addition with an electrical connecting feature, carrying fifteen points for the accommodation of the train line circuits, electro-pneumatic brakes and the train signal lines. With this coupler equipment it will be possible in one operation to couple the cars, connect the air, and all electrical circuits between cars. The operation is entirely automatic, all connections being made by impact, as with ordinary couplers.

## ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin E-43 describing and illustrating the Duntley universal electric hammer drill.

John F. Byers Machine Company, Ravenna, Ohio, has issued a circular describing, illustrating and giving the principal dimensions of its improved Model C auto-crane.

Carbic Manufacturing Company, Duluth, Minn., has issued a booklet on the Carbic light. The booklet illustrates the various types and describes the construction, operation and other points of excellence of this apparatus.

Jewett Car Company, Newark, Ohio, has issued a circular on its one-ton truck attachment for the Ford chassis. It describes and illustrates the method of substituting the attachment for the rear axle and drive, at the same time reinforcing the frame. Pictures of a number of bodies are given.

Esterline & Angus, Indianapolis, Ind., have prepared a booklet entitled "An Unique Service by an Unique Organization." This book sets forth the functions performed by this organization and illustrates its capacity and resourcefulness for the successful solution of difficult problems in engineering design. The organization confines itself strictly to that portion of the engineering work of its clients, which by reason of its nature does not come within the scope and experience of their regularly employed engineers. The efforts of this concern are devoted largely to the development of the electrical and mechanical ideas requiring detailed engineering study. Work done includes the design and construction of power-stations, development of a steam turbine rotating element, design of magnetic system for handling sheet metal plates and the development of a regulating device for correcting voltage condition and making possible the successful use of incandescent headlights on interurban cars. This organization serves a number of important manufacturers in the capacity of expert engineer, performing the duties of an engineering development department.





## Kerns and Galloglasses

Look at 'em! The Kern was a light-armed soldier; he wore only a headpiece for protection and fought with a javelin and short sword.

Whereas the galloglass was a walking hardware shop—a coat of mail, an iron helmet, a long sword and a cute little axe.

Yet the Irish were much better fighters in the light outfit of the Kern than in the later days of the Galloglass.

It's not weight and bulk that count, but speed and brains.

Just as true of brakes as of fighters.

The brains put into PEACOCK Brakes have made them light and speedy. There's no unnecessary hardware about **them**.



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Drum

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Buffalo, N. Y.



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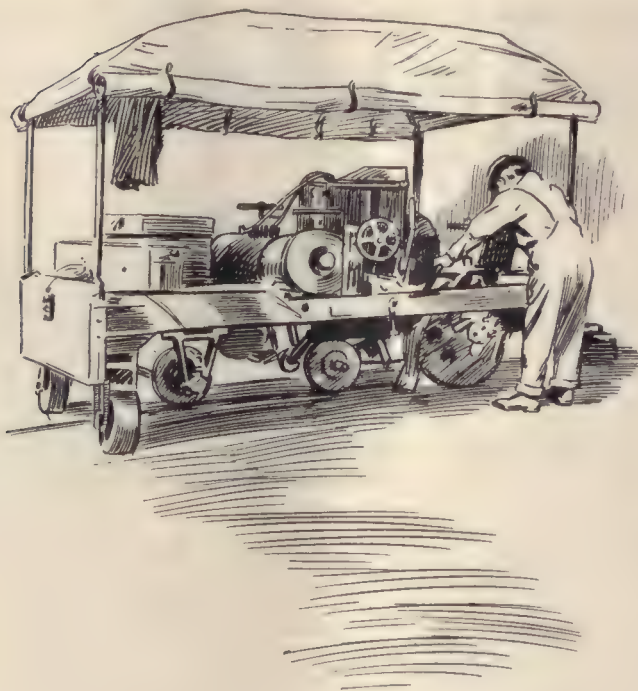
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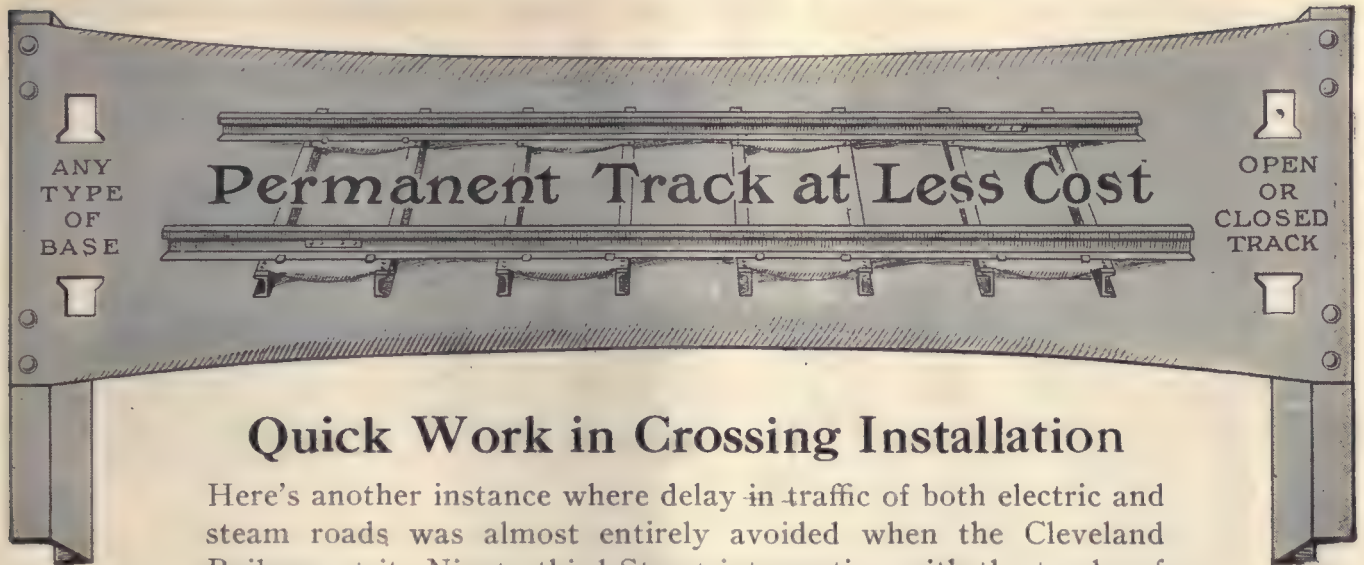
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Here's another instance where delay in traffic of both electric and steam roads was almost entirely avoided when the Cleveland Railway at its Ninety-third Street intersection with the tracks of the Wheeling & Lake Erie Railroad placed the crossing upon

# International Steel Crossing Foundations



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The (4 intersection) crossing was installed recently in one night, between midnight and morning. Neither the steam nor the electric tracks were cut until 1 o'clock and trains were let over at 2 o'clock while both trains and street cars were running freely before 4 o'clock.

These Steel Crossing Foundations are a development of the International Steel Twin Tie, and like the tie they are the most economical and durable form of track construction.

Write for particulars and a list of roads that have adopted them after a thorough test.

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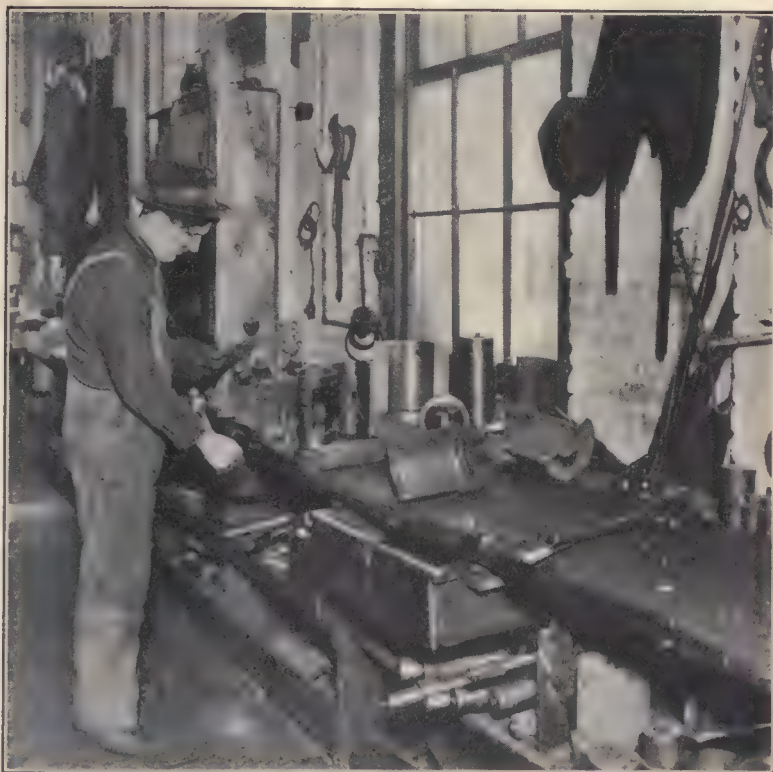
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Armature and axle straighteners  
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lever jaws and draft rigging is also

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## Use the Searchlight Department of Electric Railway Journal

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You will be put in touch *at once* with owners who have such apparatus for sale. Searchlight ads reach into every nook and corner of the electric railway industry, whether user or maker. No matter how small the ad, or how inconspicuous, it cannot be hidden. There are no pages in the publication more thoroughly scanned, more carefully read, than the Searchlight ads.

It  
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big

### Sell Discarded Apparatus

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There are lots of them open—there is a market for your abilities. An "Electric Railway Journal" Searchlight Ad will put you in touch with EMPLOYERS. Advertising rates are low and returns quick.

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In the meantime, we will make all possible dispatch with your requisition.

Yours truly,

ELECTRIC RAILWAY SUPPLY COMPANY

By A.O.B.





## A Better Looking Roof A Better Wearing Roof And a Lower Cost

The picture at top shows an Agasote Roof without headlining.

The bottom picture shows a wooden roof without headlining—about the cheapest form of roof you can build, except with Agasote.

All other things being equal you would use the Agasote Roof for appearance sake, wouldn't you?

But all other things aren't equal. The Agasote Roof has other big advantages besides looks.

Note the difference in number of carlines required. Half as many for the Agasote Roof. There's a big saving in labor and material right there.

The Agasote Roof is absolutely waterproof because the material itself is such—and it requires no white lead or canvas covering except at the joints.

There's another big saving of labor and material. And moreover a saving in weight.

In case of accidental injury the wooden roof will splinter and split and require a lot of repairing expense.

The Agasote Roof won't splinter and is easily made as good as new by replacing any injured section.

Agasote won't decay. The longer it's used the harder and stronger it grows.

Get away from old fashioned roofing methods. Use Agasote.

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(Oxy-Acetylene Process)

Any bonding operation that leads to tie-ups of traffic or interference with regular schedules is most expensive.

Flagging trains, constant attention of dispatchers and other difficulties of obstructed tracks are expenses that must be added to the cost of every bond installed through any heavy apparatus.

Add to this expense the constant chance of accident through any such bonding equipment.

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If you are contemplating any bonding or rebonding, let us send you interesting engineering data and costs obtained on many roads.

*This same portable oxy-acetylene welding outfit has immense possibilities for savings in shop and track repair work, supplementing any other process you may now be using*

## The Prest-O-Lite Company, Inc.

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*Do Your Next Bonding by the Prest-O-Lite Process*







## How Long Is a Plain Bearing Smooth?

Not very long in spite of the most careful polish you can give it. Babbitt is pretty soft in comparison to the load a journal bearing has to carry.

Furthermore, even fresh packing and fresh lubricant can't prevent scoring and roughening due to the entrance of grit.

Therefore, the coefficient of friction of a plain journal, high to begin with, rises rapidly with use.

## The advantage of Hess-Bright Ball Bearing Journals



increases with time. The wonderful hardness of the balls and their protection against any kind of abrasive action insures that their low coefficient of friction will be maintained for years while the plain bearing is wasting more power all the time.

*Hess-Bright Ball Bearings  
have proved their longevity*

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the Auditor  
About



## The International Motor-Driven Coin Register

"You know I've often felt mean when I had to report a conductor for overs or shorts. It's not fair to think a man of no clerical training is trying to beat you just because he's wrong in his figures.

"In fact, I've often wondered how many C. P. A.'s could turn in a straight account after handling a lot of Americans whose love for home amounts to frenzy—at least on the way to supper.

"With the International Coin Register the conductor simply can't help registering every fare that drops into the box; and on the busiest lines, where the coin registers have motors, he doesn't even have to turn the handle.

"There are no overs now, and when we find the turn-in shows less than the trip sheet, we're pretty sure the conductor has just borrowed a little because he's short of pocket money and expects to make up the discrepancy the next day.

"Yes, our relations with the conductors have sweetened a good bit since we gave them The International Motor-Driven Coin Register."

**THE INTERNATIONAL REGISTER COMPANY**  
15 South Throop Street, Chicago, Ill.

Manufacturers of Coin Registers, Fare Boxes, Double and Single Car Registers and Fittings  
Conductors' Punches and exclusive agents for Heeren Enamel Badges.



# Guard Your Revenue At *both* Ends



You have carefully trained your conductors and installed fareboxes and registers in an effort to secure and maintain 100% accuracy in the collection of your revenue.

But how about the other end?

A large part of that revenue goes through the motorman's hands in the form of power, schedules, wear-and-tear on equipment and comfort of pas-



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Teach him the possibilities and limitations of the equipment he controls. Show him the advantages and economies of correct car operation. And, above all, put an **ECONOMY Meter** on his car in order that he may check his own efficiency. An **ECONOMY Meter** before a trained motorman is a constant inspiration and reminder of his responsibility.

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Specialists in Meters for Every Electrical Need

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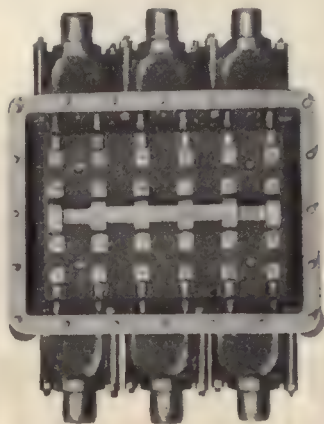
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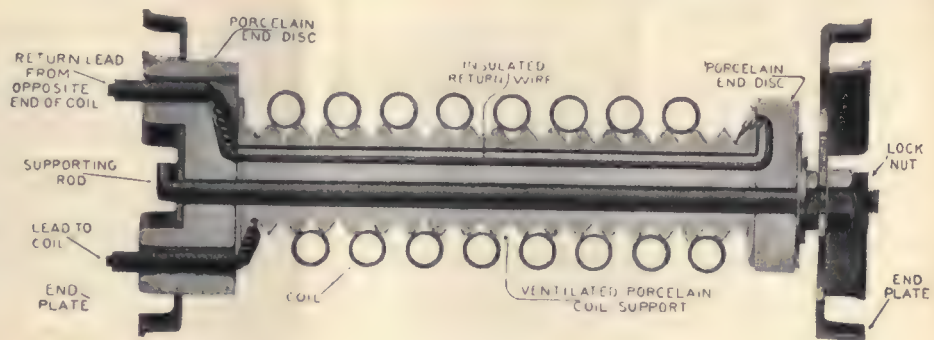
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Study this sectional illustration—see how the lead-wires are protected against chafing—note how the strong supporting rod locks the whole structure together.

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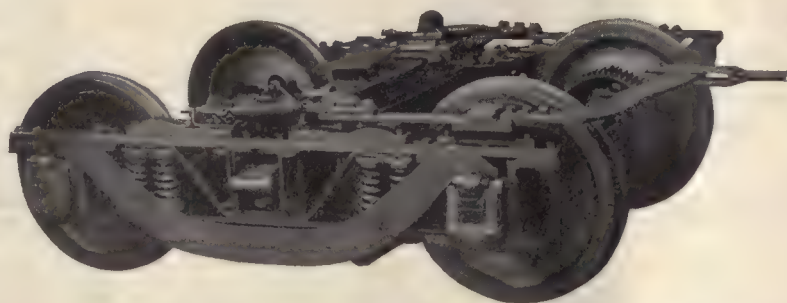
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Wheel-base, 76". Carrying capacity on center plate, 22,000 pounds

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3rd.—At the end of their serviceability steel ties have a scrap value of approximately one-third of their original cost.

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The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

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**Standard Steel Works Co.**  
Morris Building, Philadelphia, Pa.





To meet the requirements of its high class service—

**The London & Port Stanley Railway**

ordered

**Jewett Steel Cars**

one of which is shown above.

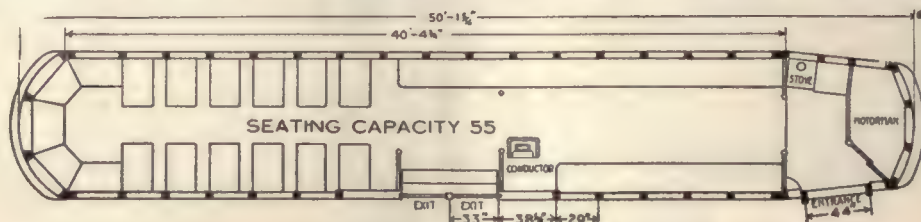
They are decidedly "cars of character."

Let us figure on *your* new requirement.

**THE JEWETT CAR CO., Newark, Ohio**



# The Car Rider's Car



THE popularity attained by the front-entrance, center-exit car in Cleveland, Ohio, the great enthusiasm aroused with the press and public of that city, in which 156 have been in successful operation, to say nothing of the fact that Toledo soon will have 60 cars of the same type, Rochester 50, Syracuse 25, and Utica 10, is proof enough that the type was well named "The Car Rider's Car." It is indeed "The Car Rider's Car"—the car about which the car

rider immediately waxes enthusiastic, the car that provides a more comfortable service, a greater degree of safety, and (because of time saved in loading and unloading) more frequent and efficient service. Its arrangement surely may be classed as nothing if not up to date. Entrance at front—conductor at center—enough space in between to accommodate 60 seated and standing passengers—no delay—no congestion—everything satisfactory and every one satisfied.

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Packard material and workmanship and the eight oil ducts mean a cool, efficient instrument under the most severe conditions.



Write for Bulletin  
E. R. J.

It contains valuable  
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**Electric Company**  
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SALES AGENTS  
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Bates Steel Poles in use by the  
DES MOINES CITY RAILWAY  
DES MOINES, IOWA, U.S.A.

Best steel pole in the world for electric railway trolley  
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A full line of convenient Malleable Fittings  
Our Steel Pole TREATISE tells a big story—Ask for it.  
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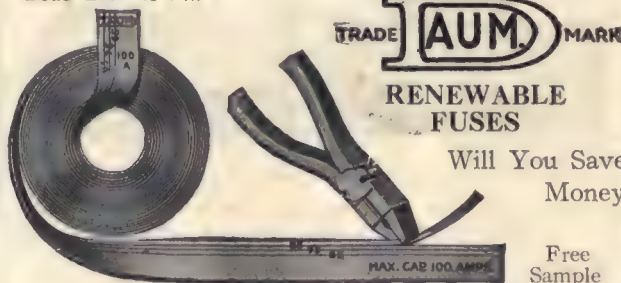
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Crown  
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**American Steel & Wire Company**  
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Dead Easy to Fill



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Maker of the First Successful Refillable Fuse on the Market

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61 Broadway, New York City



100% Rail Joint

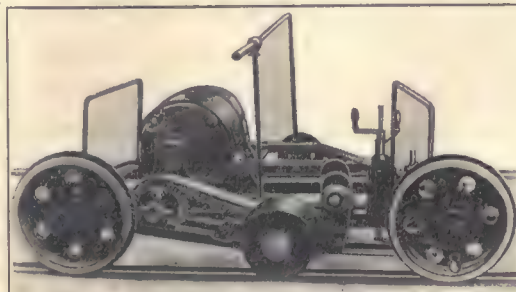
Makers of Continuous, Weber, Wolhaupter and  
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Standard—Insulated—Step—Frog and Switch

Protected by Patents

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### Western "Good Poles Quick" Northern

Quick Shipments  
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Butt Treating  
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**POLES, CROSS ARMS, TIES,  
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CAPACITY 100,000,000 FEET B. M. PER ANNUM  
SEND FOR PAMPHLET

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Address all communications to Office, Galveston, Texas  
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LIQUID  
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**AETNA INSULATION LINE MATERIAL**  
Third Rail Insulators, Trolley Bases, Poles, Harps and Wheels,  
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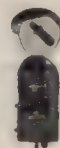
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Reeves Wood Preserver  
costs little - easy to apply  
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Manufacturers } for { Automatic } either { A.C.  
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Tongue Switches, Mates, Frogs, Curves and  
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for all classes of electrical construction and repair  
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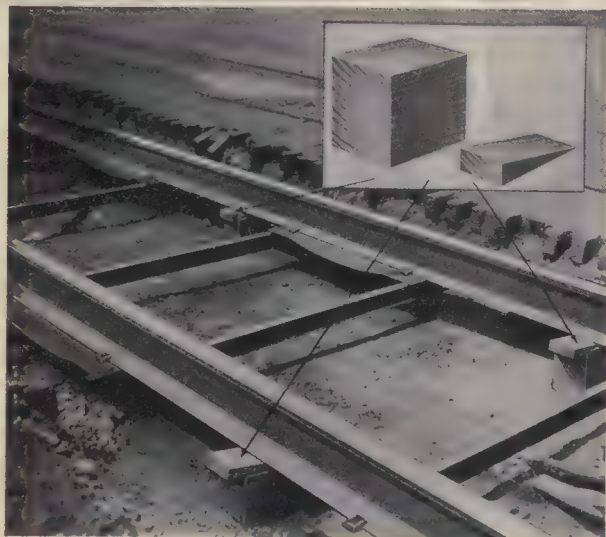


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HELP your track-leveling crew earn their money, and make money for you, by giving them the right kind of stuff to work with. Incidentally, they will make greater speed and do a better quality of work as they go.

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come ready to lay under the rail and drive up—only a few seconds' work. Thousands now in use. Please state quantity required per season, and we will estimate gladly—no obligation.

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Near Akron

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**—ANTI-CORROSIVE**

(Licensed Under Patents Granted to The International Metal Products Co.)

the Corrosion-Resisting Material from Which

**"ACME" (NESTABLE)**

Corrugated Culverts Are Made

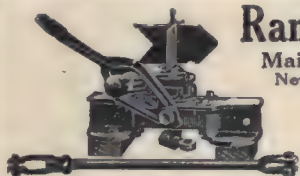
"ACME" (Nestable) Culverts—the original nestable culvert—endure indefinitely under conditions where they are tested to the utmost in all respects. They have become standard for such service under railroads and highways and in irrigation work everywhere, and many hundreds of installations the country over testify to their service and economy. Remember: "ACMES" are shipped Set-up where preferred instead of knocked-down and nested. Write for catalog.

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offer all the advantages without the disadvantages of the groove rail.

Construction approved by City Engineers.

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TRACK SPECIAL WORK



**WE MAKE THIS GRADE ONLY**

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CLEVELAND, OHIO



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Send gallon of water for analysis, and let us advise regarding your plant requirements.

**Dearborn Chemical Company**  
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Cheapest to install, operate and maintain.

Not affected by heat, grit or water.

Large capacity—  
High lift—Low  
power consumption.

Can be operated  
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**Simplest device built. One pull on the rope causes the bucket to ascend, discharge and return automatically.**

Write for prices on this device, also for catalog No. 20 showing all modern coal and ash handling systems.

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Steam Superheaters                      Mechanical Stokers

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Greatly Increase  
Efficiency and Power of  
Steam Turbines.  
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**CONSERVES** energy  
and triples the steaming  
capacity of your  
boilers. Write for Cat-  
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## Manganese Steel Track Work



FROM THE  
LARGEST LAYOUT  
TO THE  
SMALLEST INSERT  
(1)

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Owned and operated by Curtis & Co. Mfg. Co., St. Louis.



**Full Power with  
High or Lower Adjustment**

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

**Buckeye Emergency  
Jack No. 239 Special**

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

**The Buckeye  
Jack Mfg. Co.**  
Alliance, Ohio



3

**Repair Shop  
Machinery  
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Built by

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**KINNEAR Steel Rolling Doors  
FOR CAR HOUSES**

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for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



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*That's why many buyers prefer  
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Clear and Black Air Drying Insulating Varnishes  
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Inquiries invited. Catalogue on request.  
We gladly assist in selection.

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**The MODERN WAY of handling ASHES:**

**GECO Pneumatic Ashhandling Systems  
GECO Steam Jet Ash Conveyors**

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is a booklet for the man who likes to dig deep into the subject. It's not all about

**DIXON'S SILICA GRAPHITE PAINT**

Ask us and a copy is yours. 108-B is its number.

Made in Jersey City by the

**Joseph Dixon Crucible Co.**  
Established 1827





## Hale & Kilburn No. 199-AE Seat

This seat is one of our most popular interurban types. Its handsome outlines, hardwood capping for the armrest, its pressed steel framework, and its "Walkover" mechanism make it one of the handsomest and most durable seats available for interurban service. This seat is furnished in any upholstery desired, with or without footrest.



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used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

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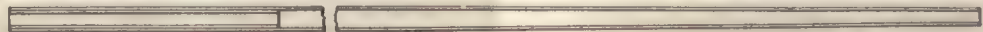
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### MANY SYSTEMS ARE USING TULC

after first making most thorough tests under all conditions. Such tests have shown that it will cut lubrication costs in half.

THE UNIVERSAL LUBRICATING CO.  
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Not Gas Pipe but High Carbon, Butt-Welded Poles Made from Special Skelp and Capable of Standing 35 to 40 Pounds Wheel Pressure on the Trolley Wire. Immediate shipment.

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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## The "Hycap-Exide" Battery

for  
STORAGE BATTERY STREET CARS

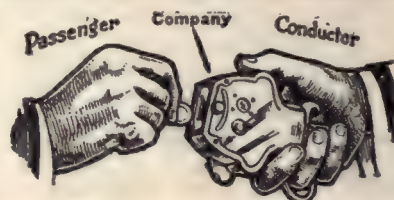
THE ELECTRIC STORAGE BATTERY CO.  
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Sole Manufacturers

"Honeycomb" and "Round Jet" Ventilators for Monitor and Arch Roof Cars, and all classes of buildings; also Electric Thermometer Control of Car Temperatures.

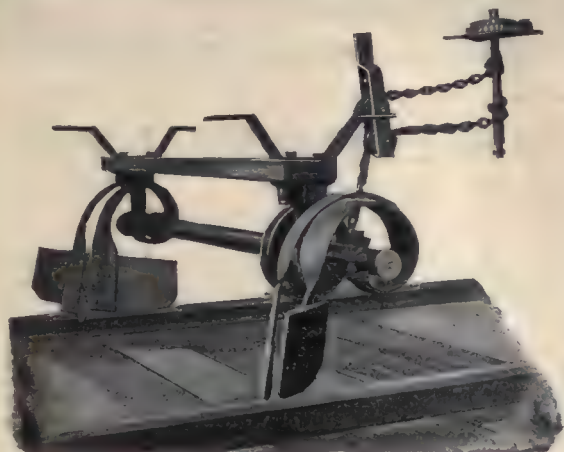
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Automatic  
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By the  
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Rooke Automatic  
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during winter's storms, by equipping every car with the

### Root Scrapers

They can be applied to any type of car, and are the right equipment for all conditions of service.

Scrapes out the groove, cleans the rail and road nine inches on both sides of each rail.

Nearly 15,000 now in use on 1000 roads.

Write for particulars and prices.

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Bemis Trucks  
Case Hardened Brake Pins  
Case Hardened Bushings  
Case Hardened Nuts and Bolts  
Manganese Brake Heads  
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Manganese Body Bushings  
Bronze Axle Bearings  
Bemis Pins are absolutely smooth and true in diameter. We carry  
40 different sizes of case hardened pins in stock. Samples fur-  
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For the Answer to your Fare Collection Problems  
Write for

"Earnings Per Passenger Mile"  
It tells how the

**BONHAM TRAFFIC RECORDER**

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FOR BOILER FEED AND ALL INDUSTRIAL USES

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Look for this



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Try Journal "Positions Wanted"  
columns for high grade positions.

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All Combined in

THE COOPER FORCED VENTILATION HOT AIR HEATER

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

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- 8—Brill fourteen bench open cars, West. 56 Motors, Brill 22-E Trucks.
- 40—Brill ten bench open cars, West. 68 Motors, Peckham Trucks.
- 16—42' Interurban Cars, Baldwin Trucks, 4 West. 121 Motors.
- 25—Brill 20' Closed Cars, 2 West. 56 Motors, Brill 22-E Trucks.
- 40—Brill 20' Closed Cars, G.E. 1000 Motors, Peckham Trucks.
- 6—Brill 30' Express Cars complete, 4 G.E. 1000 Motors, Brill 27-G Trucks, AA-1 Air Brakes.
- 30—G.E. 90 Railway Motors complete.
- 20—G.E. 73 Railway Motors complete.
- 40—G.E. 1000 Railway Motors complete.
- 20—G.E. 800 Railway Motors complete.
- 18—G.E. 87 Railway Motors complete.
- 18—G.E. 57 Railway Motors complete. Form H.
- 12—G.E. 57 Railway Motors complete. Form A.
- 22—West. 12A Railway Motors complete.
- 12—West. 38B Railway Motors complete.
- 10—West. 112 Railway Motors complete.
- 18—West. 101-B-2 Armatures, Brand New.
- 6—West. 93-A-2 Armatures, Brand New.
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- 14—G.E. 80-A Armatures, Brand New.
- 4—G.E. 87 Armatures, Brand New.
- 3—G.E. 73-C Armatures, Brand New.
- 6—G.E. 67 Armatures, Brand New.
- 12—G.E. 57 Armatures, second-hand, two turn.
- 14—West. 56 Armatures, second-hand.
- 40—K10 Controllers.
- 12—K28B Controllers.
- 26—K6 Controllers.
- 22—K11 Controllers.
- 12—K14 Controllers.
- 6—Brill 21-E Trucks, 7' 6" and 8' wheel base.

All of the above Apparatus is in first class condition for immediate service

For further particulars apply to

**W. R. KERSCHNER COMPANY, Inc.**  
50 Church Street, New York City

## ARCHER & BALDWIN

114-118 Liberty Street New York City

TELEPHONE 4337-4338 RECTOR

Rotary Converters, 25 Cycle

- 2—150 K.W. General Electric type T.C. 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 rpm., complete with 4—60 K.W. General Electric, type H, 25 cycle, 380/13,200 volt, oil cooled, single phase transformers.

Rotary Converters, 60 Cycle

- 2—150 K.W. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 RPM., complete with 4—100 K.W. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim.; 430/362 volts secy. Above will be sold with or without transformers.

### Railway Motors

- 4—75 to 90 H.P. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

## MACGOVERN & COMPANY, Inc.

FRANK MACGOVERN, Pres. & Gen. Mgr.

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NEW YORK CITY

## Steam and Electrical Machinery

Air Compressors, Pumps, Hoists, etc.

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS.

GET OUR PRICE

WE CAN SAVE YOU MONEY.

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

*Keep Your Eyes  
on the Journal's  
Searchlight  
Section*

Undisplayed  
Cards Under  
Positions Wanted  
Cost 50 Cents  
for 25 Words

Machinery  
Advertisements  
Undisplayed  
Cost \$1.50  
for 50 Words



# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplayed advertisements cost two cents a word, minimum charge 50 cents an insertion, payable in advance.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Desk Room Wanted or For Rent, Business Opportunities, Employment Agencies, and Miscellaneous

For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplayed advertisements cost three cents a word, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost \$2.40 an inch.

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

1/2 p. (1 1/2 x 3 3/4 ins.).....	\$5.00	1 in. (1 x 2 1/4 ins.).....	\$3.00
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3/4 p. (10 1/4 x 3 3/4 or 5 x 7 ins.).....	40.00	15 inches.....	40.50
1 page (10 1/4 x 7 ins.) 30 inches....	\$80.00		

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page.....	\$80 a page	18 pages.....	\$56 a page
3 pages.....	72 a page	26 pages.....	53 a page
6 pages.....	64 a page	40 pages.....	52 a page
12 pages.....	58 a page	52 pages.....	50 a page

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Before Buying

## RAILS, CARS, LOCOMOTIVES,

Machinery Equipment

## Get Zelnicker's September Bulletin

containing 40 pages of

## REAL BARGAINS

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General Office: St. Louis

### MISCELLANEOUS WANTS

#### Railway Motors Wanted

Four second hand railway motors in good condition, 500 volt, 125 to 150 hp. Box 1191, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### WANT IMMEDIATELY

30 Westinghouse 101-B2 railway motors. Describe condition, price, delivery, first letter.

Box 1189, Electric Railway Journal  
1570 Old Colony Building, Chicago, Ill.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

INTERURBAN and street railway Division and City Superintendent now employed, wishes a position as superintendent of some good railway property. Eighteen years' experience with two of the leading traction companies—train service, clerk, freight agent, and twelve years superintendent under general superintendent. Box 1194, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

LAWYER—Now law clerk for large Eastern street railway and power company. Six years in executive offices. Can handle legal and claim work. Box 1193, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

MOTORMAN, conductor, mechanic. Will report daily on accidents, handling of equipment, current consumption, fare collections, schedules, business conditions. Efficiency man. Box 1195, Elec. Ry. Jour.

SUPERINTENDENT of large interurban road wishes to make a change. Steam, city and interurban experience, 12 years with present company. Correspondence solicited. Box 1188, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

TECHNICAL graduate, 36, married, now employed as chief electrician in charge of car equipment (construction and operation) desires new position. Experience covers all classes of street car and high speed interurban Sprague and Westinghouse multiple unit systems (600 and 1200 volt) and modern 1200 volt locomotives. Fifteen years in the field (at home and abroad). Excellent references, correspondence solicited, locate anywhere. Box 1196, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

### POSITIONS VACANT

AUDITOR for car plant, building all kinds of steel and wooden cars for domestic and export use. Man required must have thorough knowledge of accounting and cost work on car construction. No other need apply. Good position and salary for man possessing these qualifications. Plant ideally located. Applications will be privately examined by financial officer and treated as extremely confidential. Box 1170, Elec. Ry. Jour.

SECOND engineer familiar with operation of Curtis turbines, surface condensers, stokers and gas engines wanted. Give experience, references and wages expected. Plant in Middle West. Box 1186, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

WANTED—Young man having experience in way and structure and shop-accounting, to fill like position with large traction line. Application should state experience, present occupation, age, and salary desired. Box 1190, Elec. Ry. Jour.

### AGENTS AND SALESMEN

#### Can Produce the Business

Experienced railway supply salesman desires new connection. Is energetic, a hard worker and producer of new business. Well acquainted with trade. Box 1187, Elec. Ry. Jour.

## Salesman Wanted

Experienced Salesman, preferably technical education, by manufacturer to sell to electric street railways and engineers in Chicago and vicinity. Give complete past experience, references, etc.

Box 1192, Elec. Ry. Jour., 1570, Old Colony Bldg., Chicago, Ill.

## Get Your Wants into the Searchlight



# READY - REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

## Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

**Acetylene Service.**  
Prest-O-Lite Co., Inc.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Alloys, Steel and Iron.**  
Titanium Alloy Mfg. Co.

**Anchor, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Automobiles and Busses.**  
Brill Co., The J. G.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Taylor Elect. Truck Co.

**Axles, Car Wheel.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbitting Devices.**  
American General Engrg. Co.  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Bankers and Brokers.**  
Halsey & Co., N. W.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings and Bearing Metals.**  
American General Engrg. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Hardy & Sons, Wm. A.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings, Roller and Ball.**  
Gurney Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.

**Bearings, Roller Side.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.  
Zelnicker Sup. Co., W. A.

## Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boilers.**  
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Bond Clips.**  
Electric Railway Improve. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Prest-O-Lite Co., Inc.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**  
Bates Expanded Steel Truss Co.  
Electric Service Supplies Co.  
Int'l Creosoting & Constr. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

**Brake Adjusters.**  
Kerschner Co., Inc., W. R.  
Smith-Ward Brake Co.

**Brake Shoes.**  
Amer. Brake Shoe & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**  
Allis-Chalmers Mfg. Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Westinghouse Trac. B. Co.

**Brooms, Track, Steel or Rattan.**  
Western Electric Co.  
Zelnicker Sup. Co., W. A.

**Brush Holders.**  
Anderson Mfg. Co., A. & J. M.

**Brushes, Carbon.**  
Dixon Crucible Co., Jos.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Buckets, Grab.**  
Beaumont Co., R. H.

**Bumpers, Car Seat.**  
Electric Service Supplies Co.  
Imperial Rubber Co.

**Bunkers, Coal.**  
Beaumont Co., R. H.

**Bunting.**  
Boyle & Co., Inc., John.

**Bushings, Fibre.**  
Diamond State Fibre Co.

**Bushings, Case Hardened and Manganese.**  
Bemis Car Truck Co.

**Bushings, Rubber.**  
Imperial Rubber Co.

**Buttons. (See Badges and Buttons.)**

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—see those headings.)**

**Car Panel Safety Switches.**  
Krantz Mfg. Co.

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. See those headings.)**

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Self-Propelled.**  
Electric Storage Battery Co.  
General Electric Co.

**Cars Stop, Automatic.**  
Consolidated Car Heating Co.

**Castings, Brass.**  
Frankel Connector Co.

**Castings, Composition or Copper.**  
Anderson M. Co., A. & J. M.

**Castings, Gray Iron and Steel.**  
Amer. Brake Shoe & Fdy. Co.  
American Gen'l Eng'g Co.  
American Steel Foundries.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
St. Louis Steel Foundry.  
Standard Steel Works Co.  
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**  
Amer. Brake Shoe & Fdy. Co.  
American Gen'l Eng'g Co.  
Bemis Car Truck Co.  
Long Co., E. G.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**  
Eclipse Railway Supply Co.  
Electric Service Supplies Co.  
Holden & White.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Union Electric Co.  
Wood Co., Chas. N.

**Ceiling, Car. (See Headlining.)**

**Chain & Belt Machinery**  
Beaumont Co., R. H.

**Charging Sets, Storage Battery.**  
General Electric Co.

**Cheese Cloth.**  
Boyle & Co., Inc., John.

**Chemists.**  
Little, Inc., Arthur D.

**Circuit Breakers.**  
Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Ele. & M. Co.

**Clamps.**  
Frankel Connector Co.

**Clamps and Connectors for Wires and Cables.**  
American Gen'l Eng'g Co.  
Anderson M. Co., A. & J. M.  
Electrical Engrs. Equip. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Klein & Sons, Mathias.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track. (See also Snow Plows, Sweepers and Brooms.)**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Western Electric Co.  
Van Dorn & Dutton Co.

**Cleats, Car Wiring.**  
General Electric Co.

**Clusters and Sockets.**  
General Electric Co.

**Coal and Ash Handling. (See Conveying and Hoisting Machinery.)**

**Coil Banding and Winding Machines.**  
American Gen'l Eng'g Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
Western Electric Co.

**Coils, Armature & Field.**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coils, Choke & Kicking.**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Ele. & M. Co.

**Coin-Counting Machines.**  
International Register Co., The  
Johnson Fare Box Co.



# Weston

## A.C. and D.C. Portable Electrodynamometer Voltmeter, Model 341

An instrument of Precision guaranteed to an accuracy of  $\frac{1}{4}$  of 1% of full scale value on the working part of the scale, whether used on direct current circuits or alternating current circuits of any frequency up to 133 cycles per second and any wave form. Double ranges are furnished in this model.

The movable system has an extremely low moment of inertia and is very effectively damped. Indications are independent of room temperature and the instrument is shielded from external magnetic fields. The scale,  $5\frac{1}{4}$  inches long, is hand-calibrated and uniform throughout the upper four-fifths portion. It is provided with a mirror over which the knife-edge pointer travels, and the pointer may easily be adjusted to zero by means of a zero-correcting device.

For complete information regarding Model 341 write for Bulletin No. 2004. Other models in this group are Model 370 A.C. and D.C. Portable Ammeter, described in Bulletin No. 2003; Model 310 Single-Phase and Direct Current Portable Wattmeter, and Model 329 Portable Polyphase Wattmeter, both described in Bulletin No. 2002.

Weston Portable Instrument Transformers are described in Bulletin No. 2001.

**Weston Electrical Instrument Company**  
21 Weston Ave., Newark, N. J.

New York  
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Denver

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Detroit  
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Winnipeg

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## U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY  
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and Enamels  
Chillingworth Seamless Gear Cases

Special Agents for { Tool Steel Gear & Pinion Co.  
Johnson Fare Box Co.  
C. & C. Electric & Mfg. Co.  
Holden & White

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Eastern Agents for Union Fibre Co.  
Southern and New England Agents for Thayer & Co.



**Don't Buy**  
new field coils  
**Don't Sell**  
old field coils

## Exchange

your old field coils for new coils

Just send your old coils to us. We'll remove the old insulation, clean and anneal the wire and reinsulate it with

## Salamander Pure Asbestos

A guarantee of long life and dielectric strength. Then we'll rewind the wire into new coils of the same physical characteristics as the old coils. It amounts practically to an exchange, for our only charge is a trifling one for the actual insulation used. It's cheaper than buying new coils. It's better than selling old coils. Try us and see.

## Independent Lamp & Wire Co., Inc.

Offices:  
1737 Broadway, New York

FACTORIES:  
York, Pa., and Weehawken, N. J.



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

**Commutator Slotters.**  
American General Eng'g Co.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices.**  
American General Eng'g Co.  
General Electric Co.

**Commutators or Parts.**  
American General Eng'g Co.  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Long Co., E. G.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Compressors, Air.**  
Allis-Chalmers Mfg. Co.  
Curtis & Co., Mfg. Co.  
General Electric Co.  
Westinghouse Trac. B. Co.

**Condensers.**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Conduits.**  
Standard Underground Cable Co.  
Western Electric Co.

**Connectors, Solderless.**  
Frankel Connector Co.

**Controller Fingers.**  
Lord Mfg. Co.

**Controller Handles.**  
Lord Mfg. Co.

**Controller Regulators.**  
Electric Service Supplies Co.

**Controllers or Parts.**  
Allis-Chalmers Mfg. Co.  
American General Eng'g Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Kerschner, W. R.  
Westinghouse Elec. & M. Co.

**Controlling Systems.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Converters, Rotary.**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**  
Beaumont Co., R. H.  
Green Eng'g. Co.

**Cord, Bell, Trolley, Register, etc.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
Imperial Rubber Co.  
International Register Co., The  
Long Co., E. G.  
Roebbling's Sons Co., John A.  
Samson Cordage Works.

**Cord Connectors and Couplers.**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

**Cotton Duck.**  
Boyle & Co., Inc., John.

**Couplers, Car.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Long Co., E. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

**Cranes. (See also Hoists.)**  
Allis-Chalmers Mfg. Co.  
Beaumont Co., R. H.  
Niles-Bement-Pond Co.  
Van Dorn & Dutton Co.

**Cresosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**  
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Culverts.**  
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures.**  
Brill Co., The J. G.  
Curtain Supply Co.  
Electric Service Supplies Co.  
Hartshorn Company, Stewart.  
Pantasote Co., The.  
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene.**  
Prest-O-Lite Co., Inc

**Derailing Devices. (See also Track Work.)**  
Cleveland Frog & Crossing Co.

**Despatching Systems.**  
Simmen Automatic Ry. Sig. Co.  
Western Electric Co.

**Destination Signs.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Western Electric Co.

**Detective Service.**  
Consolidated Car Heating Co.  
Wisch Service, P. Edward.

**Door Operating Devices.**  
National Pneumatic Co.

**Doors and Door Fixtures.**  
Brill Co., The J. G.  
General Electric Co.  
Hale & Kilburn Co.

**Doors, Folding Vestibules.**  
National Pneumatic Co.

**Doors, Steel-Rolling.**  
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**  
American Steel & Wire Co.  
Electric Service Supplies Co.  
Long Co., E. G.  
Niles-Bement-Pond Co.  
Ohio Brass Co.

**Dryers, Sand.**  
Electric Service Supplies Co.  
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**  
Archbold-Brady Co.  
Brownell, H. L.  
Byllesby & Co., Inc., H. M.  
Ford, Bacon & Davis.  
Gulick-Henderson Co.  
Hunt & Co., Robert W.  
Jackson, D. C. & Wm. B.  
Little, Arthur D.  
Richey, Albert S.  
Roosevelt & Thompson.  
Sanderson & Porter.  
Scofield Engineering Co.  
Stephenson Sons & Co.  
Stone & Webster Eng. Corp.  
Westinghouse Church Kerr & Co.  
White Companies, J. G.  
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**  
Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & M. Co.

**Engines, Steam.**  
Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & M. Co.

**Fare Boxes.**  
American General Eng'g Co.  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
Johnson Fare Box Co.

**Fences and Fence Posts.**  
American Steel & Wire Co.  
Bell Lumber Co.

**Fencing Wire.**  
American Steel & Wire Co.

**Fenders and Wheel Guards.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Cleveland Fare Box Co.  
Consolidated Car Fender Co.  
Eclipse Railway Supply Co.  
Electric Service Supplies Co.  
Lord Mfg. Co.  
Star Brass Works.  
Western Electric Co.

**Fibre.**  
Diamond State Fibre Co.  
U. S. Metal & Mfg. Co.  
Westinghouse Elec. & M. Co.

**Fibre Tubing.**  
Diamond State Fibre Co.  
Westinghouse Elec. & M. Co.

**Field Colls. (See Colls.)**

**Filters, Water.**  
Scalfe & Sons Co., Wm. B.

**Fire Extinguishing Apparatus.**  
Imperial Rubber Co.

**Flooring Composition.**  
American Mason Safety Tread Co.  
Western Electric Co.

**Forgings.**  
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**  
American General Eng'g Co.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
Daum, A. F.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**  
Columbia M. W. & M. I. Co.  
General Electric Co.

**Gaskets.**  
Diamond State Fibre Co.  
Imperial Rubber Co.  
Power Specialty Co.

**Gas Producers.**  
Westinghouse Elec. & Mfg. Co.

**Gates, Car.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.

**Gages, Oil and Water.**  
Ohio Brass Co.

**Gear Blanks.**  
Carnegie Steel Co.  
Diamond State Fibre Co.  
Standard Steel Works Co.

**Gear Cases.**  
Electric Service Supplies Co.  
Kerschner, W. R.  
U. S. Metal & Mfg. Co.  
Westinghouse Elec. & M. Co.

**Gears and Pinions.**  
American General Eng'g Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Diamond State Fibre Co.  
Electric Service Supplies Co.  
General Electric Co.  
Kerschner, W. R.  
Long Co., E. G.  
Nuttall Co., R. D.  
Union Electric Co.  
U. S. Metal & Mfg. Co.  
Van Dorn & Dutton Co.

**Generating Sets, Gas-Electric.**  
General Electric Co.

**Generators, Alternating Current.**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Generators, Direct Current.**  
Allis-Chalmers Mfg. Co.  
Dick, Kerr & Co., Ltd.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**  
Dixon Crucible Co., Joseph.  
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Wheels.**  
Goldschmidt-Thermit Co.  
Railway Track-work Co.  
Western Electric Co.

**Grinders, Portable, Electric.**  
General Electric Co.  
Goldschmidt-Thermit Co.  
Grinder Co., E. F.  
Railway Track-work Co.  
Seymour Portable Rail Gunder Co., E. F.  
U. S. Metal & Mfg. Co.

**Guards, Trolley.**  
Electric Service Supplies Co.  
Ohio Brass Co.

**Harps, Trolley.**  
American General Eng'g Co.  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
Nuttall Co., R. D.  
Star Brass Works.  
Western Electric Co.

**Headlights.**  
Electric Service Supplies Co.  
General Electric Co.  
Long Co., E. G.  
Ohio Brass Co.  
St. Louis Car Co.  
Union Electric Co.  
Westinghouse Elec. & M. Co.

**Headlining.**  
Kerschner Co., Inc., W. R.  
Pantasote Co., The.

**Heaters, Car (Electric).**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Johns-Manville Co., H. W.

**Heaters, Car, Hot Air.**  
Cooper Heater Co.  
Smith Heater Co., Peter.

**Heaters, Car, Hot Water.**  
Cooper Heater Co.  
Smith Heater Co., Peter.

**Heaters, Car, Stove.**  
Electric Service Supplies Co.  
Smith Heater Co., Peter.

**Hoists & Lifts.**  
Beaumont Co., R. H.  
Curtis & Co., Mfg. Co.  
Duff Mfg. Co.  
Ford Chain Block & Mfg. Co.  
Kerschner Co., Inc., W. R.  
Niles-Bement-Pond Co.  
Van Dorn & Dutton Co.

**Hose Bridges.**  
Ohio Brass Co.

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is the disease that the native of Kashmir contracts as a result of wearing a box containing hot embers strapped to his belly in winter time.

You see the box doesn't produce an even warmth, simply heats him up in spots—then kangri sets in at those spots as nature's kick against the practice, just as burned spots on a commutator represent the natural kick against a mischosen or misapplied carbon brush.

It is the duty of all Morgan engineers to preclude the possibility of commutator kangri by studying the needs of the service and prescribing the right grade of Morganite brush to deliver uninterrupted commutation.

"But that character of service will cost me a lot of money," you say.

NO SIR!! Emphatically No.  
It saves you money and your satisfaction at the economy is our best advertisement.



Factory, Brooklyn, N. Y.

AGENTS:

Lewis & Roth Co., 312 Denckla Bldg., Philadelphia  
Electrical Engineering & Mfg. Co.  
First National Bank Bldg., Pittsburgh  
W. L. Rose Equipment Company, La Salle Bldg.  
St. Louis, Mo.  
Herzog Electric & Eng'g Co., 150 Steuart St.,  
San Francisco, Cal.









# TITANIUM TREATED RAIL

## Carrying 1000 St. Louis Cars a Day on Olive Street

Olive Street is one of the principal thoroughfares of St. Louis. Each track in the section pictured carries 365,000 cars per annum, and the average weight per car is 45,000 lb.

Last year the 112 lb. 9 in. girder rail laid on this street in 1906 was replaced by 132 lb. Lorain Section 440 rail made according to this specification:

Carbon .....	0.70 to 0.85
Silicon not over .....	0.20
Phosphorus not over .....	0.04
Manganese .....	0.60 to 0.90

and

Treatment with 1/10 Per Cent Metallic Titanium

It's characteristic of Titanium users to order more. St. Louis' first Titanium-treated rail was bought in 1912.

When will you begin?

## TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

Processes and Products Patented

General Office and Works:  
Niagara Falls, N. Y.



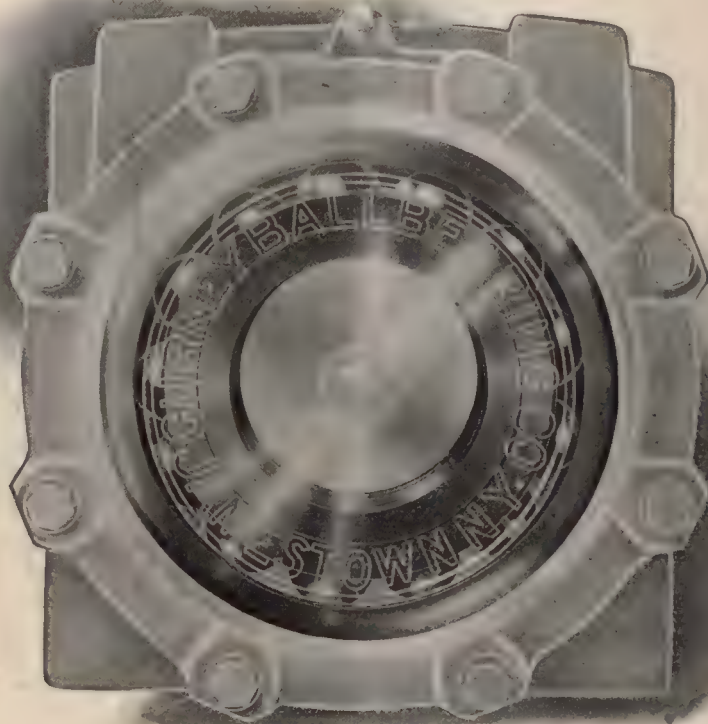
Pittsburgh Office: Oliver Building  
Chicago Office: Peoples Gas Building

New York Office: 15 Wall Street

### AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland  
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England





**I**N THE STRUGGLE FOR REDUCED OPERATING EXPENSE  
GURNEY BALL BEARING JOURNAL BOXES TAKE A  
VERY DEFINITE AND INTENSELY ACTIVE PART IN  
THAT THEY ACCOMPLISH A REMARKABLE SAVING OF  
POWER AND COST OF MAINTENANCE AND INSPECTION.  
WE INVITE REQUESTS FOR DATA AND PROPOSALS.

**GURNEY BALL BEARING CO.**

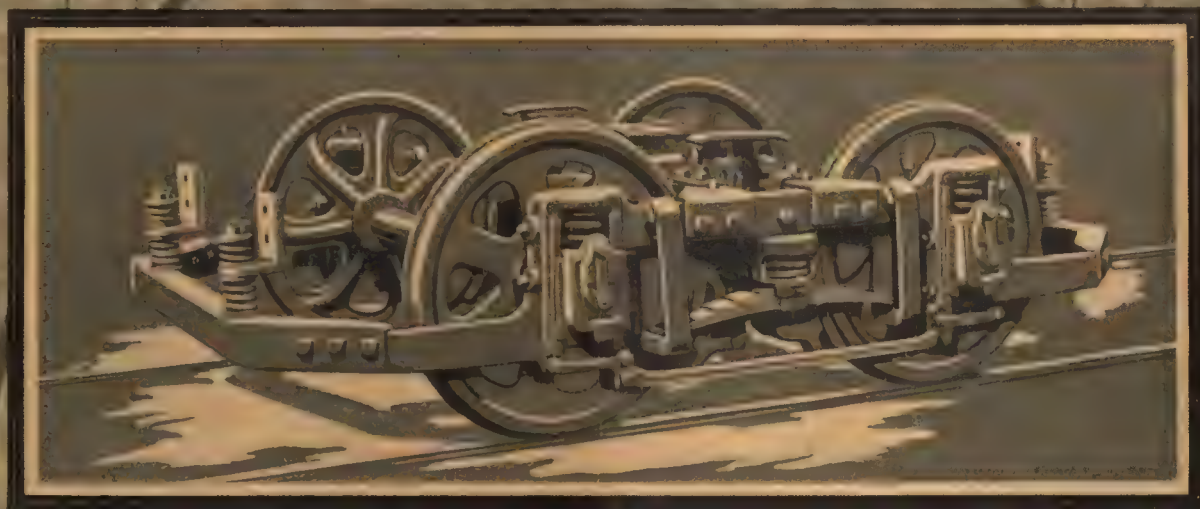
CONRAD PATENT LICENSEE

**JAMESTOWN NEW YORK**

**CHICAGO ILL.**

**NEW YORK CITY**



**BRILL**

### Brill 76-E Truck

**T**HE combination of solid-forged side frames, angle end frames, deep angle transoms fastened to the side frames with single- and double-corner brackets and fold-over gusset plates, one-piece cast-steel bolster, oil-retaining center plates, "Half-ball" brake hangers, graduated spring system and bolster guides, gives the Brill 76-E Truck its superior strength and riding qualities. The Brill Graduated Spring System puts in play a set of soft-acting spiral springs when the car has no more than a seated load of passengers. The Brill Bolster Guide eliminates the necessity for chafing plates with their friction and locking effect under brake pressure and motor force.

THE J. G. BRILL COMPANY,  
AMERICAN CAR COMPANY,  
G. C. KUHLMAN CAR COMPANY,  
WASON MFG. COMPANY,

PHILADELPHIA, PA.  
ST. LOUIS, MO.  
CLEVELAND, OHIO  
SPRINGFIELD, MASS.





## G-E Controllers at the Convention

No one wants to see the K Control idea changed—but everyone is glad to note the little improvements at the G-E Booth each year. This is because it is the best control ever devised.

The simplicity and reliability of the K Control have been incorporated in the Sprague-General Electric Multiple Unit P C Control. Service tests have proved this to be the most reliable and economical multiple unit control ever designed.

You will also be interested to see the G-E Controllers that have so successfully handled 3,000 volts on the Chicago, Milwaukee & St. Paul.

You can get up-to-date on the control proposition by asking the representatives at the G-E Booth, No. 20.



### General Electric Company

General Office, Schenectady, N. Y.

P C Control





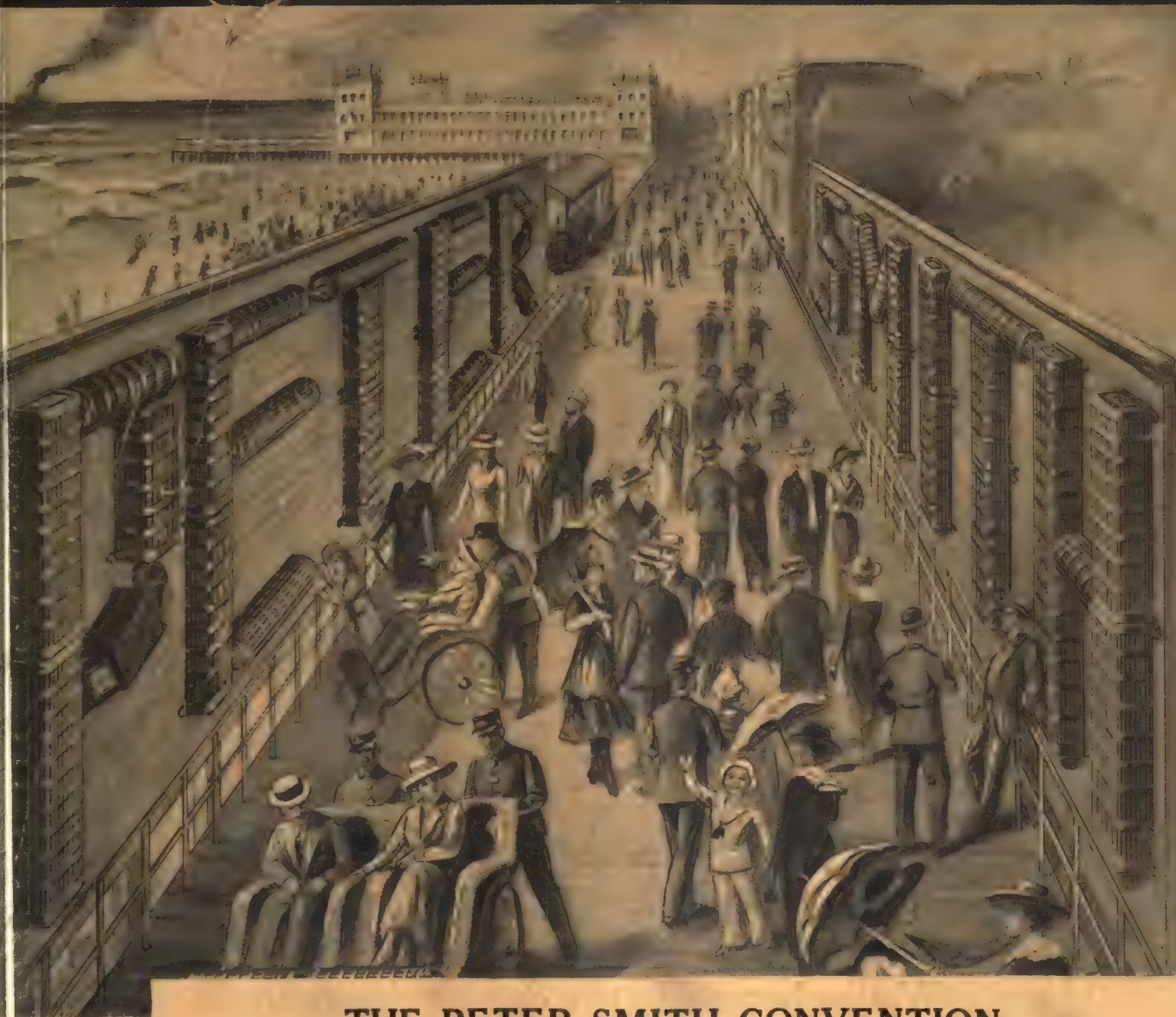
Publicity in Kansas City—Boston Fare Case

# ELECTRIC RAILWAY JOURNAL

New York, September 30, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 14 10c a copy



## THE PETER SMITH CONVENTION

Of all that is best in car heating and ventilation equipment.

Peter Smith Hot Water Heaters unexcelled for the equable heating of interurban cars.

Peter Smith Forced Draft Coal Heaters, the first combination of coal heating and electric ventilation, now used on more than 8000 cars.

Peter Smith Gravity Electric Heaters a remarkable advance in design and construction.

Peter Smith Forced Draft Electric Heater, the first application of electricity to both heating and ventilation.

Peter Smith Thermostatic Control for making electric heating economical and satisfactory.

**THE PETER SMITH HEATER COMPANY, DETROIT, MICH.**

HEATER SPECIALISTS FOR THIRTY-FIVE YEARS







## Train Operation

**"JOE,"** said the General Manager to the Superintendent, "I have decided to buy no more trailer cars. In future every car will be equipped with motors of suitable capacity to handle only its own load. I am satisfied that two or three-car multiple-unit operation is the best way to handle our rush-hour service.

"When every car is a motor car, with perhaps two motors instead of four, or at least four smaller motors, we secure far greater flexibility. It cuts out a lot of switching, and saves time when we are adding or cutting off cars. On Sundays and holidays we won't be overloading the motors pulling trailers all day. We can make the train size and schedules to suit the occasion; for picnics and excursions, it's ideal.

"Multiple-unit operation is like a telescope suit case, you stretch it out to accommodate the load. The initial investment is slightly higher, but when you consider that with multiple-unit equipment we are able to handle our regular traffic better, and are at the same time prepared to meet all emergencies, the extra investment is justified."

"Boss, I am glad to hear you mention about overloading the motors," answered Joe. "I don't suppose you can blame them, but the transportation department never hesitate to add trailers to take the crowd, no matter how much we yell about burning up the equipment. Multiple-unit operation will stop that. The Toledo Railways and the Mahoning and Shenango Valley have adopted multiple-unit operation, using Westinghouse HL Control."

### Westinghouse Electric & Manufacturing Co.

Sales Offices in all  
Large American Cities



East Pittsburgh,  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 14

NEW YORK, SEPTEMBER 30, 1916

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

**MCGRAW PUBLISHING COMPANY, INC., 239 WEST 39TH STREET, NEW YORK**

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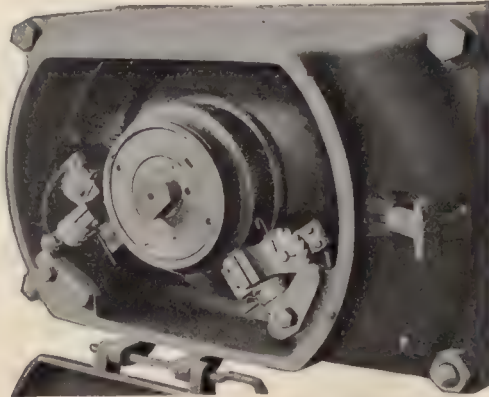
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No back volumes for more than one year, and no back copies for more than three months.

One week required for change of mailing address. New and old addresses must be given.

Circulation of this issue 7250 copies



## "Bungalow" type of Westinghouse Air Compressors



### Brush Holders

—Are permanently located slightly back of neutral position, the most efficient one, since armature rotates in one direction only.

—Are located in lower quadrants, making accessibility easy from the pit. Brushes and holders tend to keep themselves clean.

—Are fastened to motor case with one tap screw and one dowel pin, making removal exceptionally easy.

### Brush Holder Springs

—Are a combination coil and flat spring, which gives double amplitude, takes care of very small vibrations, eliminates chattering, and improves commutation.

—May be given any tension desired by moving the wire lever on the notched dial.

—Provides resting place for flat end of spring while brushes are being taken out.

—Are adjusted without removing and without use of tools.



*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



NEW YORK:

City Investing Building

ST. LOUIS:

Boatmen's Bank Building



# Westinghouse

## Switchboards and Switchboard Gear Pre-eminent

The following typical switchboard orders, recently placed with the Westinghouse Electric and Manufacturing Co., for initial equipment of new generating stations, are representative of the excellence and high standards of Westinghouse switchboards and switch gear:

**Union Gas and Electric Company, Cincinnati, Ohio** (Sargent & Lundy, Consulting Engineers), New West End Power House. Initial capacity 62,500 kva., 3-phase, 60-cycle, 13,200 volts. Ultimate capacity 287,000 kva.

One 4-section Control Desk; one 14-panel, three 5-panel, two 2-panel switchboards, eight 2,000 amp. type "0-2," 58 type "E-6" oil breakers.

**Buffalo General Electric Co., Buffalo, N. Y.** (Stone & Webster, Consulting Engineers), New River Steam Station. Initial capacity 66,666 kva., 3-phase, 25-cycle, 12,000 volt. Ultimate capacity 233,000 kva., one 8-panel, one 6-panel, one 5-panel, one 3-panel switchboards. Twelve 2,000 amp. type "0-2," seventeen 600 amp. type "0-1" oil breakers.

**Dayton Light & Power Co., Dayton, Ohio** (Thomas E. Murray, Consulting Engineer), New Millers Ford Generating Station. Initial capacity 31,250 kva., 3-phase, 60-cycle, 6,600 volt. Ultimate capacity 125,000 kva., one 7-section control desk; one 10-panel, one 8-panel, one 3-panel switchboard. Ten type "0-2," 13 type "E-6," 16 type "E-8" oil breakers.

**Montana Power Co., Holter Junction, Montana.** New Holter Hydro-Electric Development. Initial and ultimate capacity 48,000 kva., 3-phase, 60-cycle, 6,600 volt, one 7-panel, one 6-panel, three 5-panel switchboards. Eleven type "E-6," seven 110,000 volt type "G-A" oil breakers.

**Public Service Co. of Northern Illinois, Joliet, Ill.** (Sargent & Lundy, Consulting Engineers). New No. 9 Power Station. Initial capacity 12,500 kva., 3-phase, 60 cycle, 12,000 volt. Ultimate capacity 50,000 kva., one 2-section control desk, one 9-panel, one 5-panel, three 4-panel switchboards. Six type "G-B" oil breakers.

The standing of consulting engineers mentioned, under whose supervision most of this business was placed, is a guarantee of engineering and apparatus required for installations of this size, and typical of Westinghouse switchboards.

In addition to the above initial equipments, the following list represents some of the recent orders received for additions to previous Westinghouse switchboards:

**Duquesne Light Co., Pittsburgh, Pa.** Brunots Island Generating Station. Additional capacity 65,000 kva. One 4-section control desk, one 10-panel switchboard, 19 type "0-1," 6 type "0-2" oil breakers.

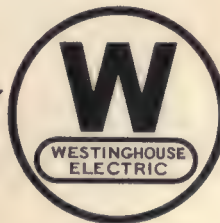
**Michigan Northern Power Co., Sault Ste. Marie, Mich.** Hydro-Electric Station. Additional capacity 27,000 kva., 39-panel switchboard, 116-300 amp. electrically operated type "B" oil breakers, four 3,000 amp. and two 2,000 amp. type "E-4" oil breakers.

**Northern Ohio Traction & Light Co., Akron, Ohio.** Gorge Generating Station. Additional capacity 44,400 kva. Equipment for three control desk sections, two type "E-4," one type "C-1" oil breakers.

**Edison Illuminating Co., Lancaster, Pa.** Engleside Station. Additional capacity 4,950 kva., transformers 3-phase, 60-cycle, 11,000 volts. Equipment for three control desk sections.

**Westinghouse  
Electric & Manufacturing Company  
East Pittsburgh, Pa.**

SALES OFFICES IN ALL LARGE AMERICAN CITIES







Sixty-third St. North from Jefferson St., Philadelphia

# Phono-Electric

Is Good at "Breaks" in Grade

It is quite as difficult to keep the trolley wire in true alignment at breaks in grade as it is to do so over curves.

If the wire and track are not kept parallel or the current-collecting equipment is sluggish, the wheel leaves the wire and begins to pound it.

Phono-Electric Trolley Wire takes blows like this without injury because it is of the same tough and ductile material throughout. It is not an armored wire—it is **all** armor.

**BRIDGEPORT BRASS CO**  
BRIDGEPORT CONNECTICUT





## O-B Type E Cross-Over

Has O-B Bronze Cam Tips. These tips hold the wire firmly in the groove and provide a smooth approach for the wheel.

They not only cut the time of installation but bear the brunt of the wear and are easily and economically renewed.

The O-B Type E Cross-Over is used where it is not desired to insulate one wire from the other. It is made in two forms—Form 1 is adjustable between 30° and 60°, Form 2 between 60° and 90°.

The first has deflector bars which are not necessary in the wider angles.

There are 11 forms of Cross-Overs listed on Pages 210-218 of Catalog No. 16. One of them is the right one for you.

**The Ohio Brass Company**  
**Mansfield**  
**Ohio**



ANY  
TYPE  
OF  
BASE

## Permanent Track at Less Cost

OPEN  
OR  
CLOSED  
TRACK



## International Steel Twin Ties On Huntington Avenue, Boston

The adaptability of the International Steel Twin Tie for paved or open track in city streets has been proved by many installations.

A recent job in open work was that in the park strip on

Huntington Avenue, one of Boston's finest thoroughfares.

These ties were installed to insure a permanent track—one that would not have to be disturbed during the entire life of the rail.

### The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

#### REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal.,  
Los Angeles, Cal., Seattle, Wash.

R. J. Cooper Co.,  
Salt Lake City, Utah.

J. E. Lewis & Co.,  
Dallas, Texas.

Maurice Joy,  
Philadelphia.

William H. Ziegler,  
Minneapolis, Minn.





# Co-Operation

You know what you **need** in signals and you are entitled to have your views respected when it comes to buying the equipment.

Suppose you decide to buy signals from the United States Electric Signal Company.

An engineering organization is placed at your disposal having an experience covering nearly twenty years in signal **design, manufacture and application**—not merely **selling**.

Their recommendations are made in the light of experience in **all** these factors—and that is valuable.

Your requirements are considered as **special** and U. S. Automatic Electric Signals are made to cover your requirements because we operate our own factory.

In that, we are exclusive in the electric railway signal business.

Your signals are not taken off stock shelves.

## United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.







## Speaking About Columbia-Made Coils

You know that Columbia-made coil winding and taping machines are standard on many systems.

But do you know that we also make armature and field coils for all types of motors?

If you are not completely equipped to turn out all the coils you need in good time and at an economical figure, give us a chance to show you.

## Quick Coil Delivery and Low Prices

Columbia quality, price and delivery are also embodied in these items:

### TOOLS

Armature and axle straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

### CAR EQUIPMENT

Brush-holders and brush-holder springs of all types  
Brake, door and other handles  
Brake forgings, rigging, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or mall. iron)  
Grid resistors  
Third-rail contact-shoe beams and accessories  
Trolley poles (steel) and wheels



**Columbia Machine Works & Malleable Iron Co.**

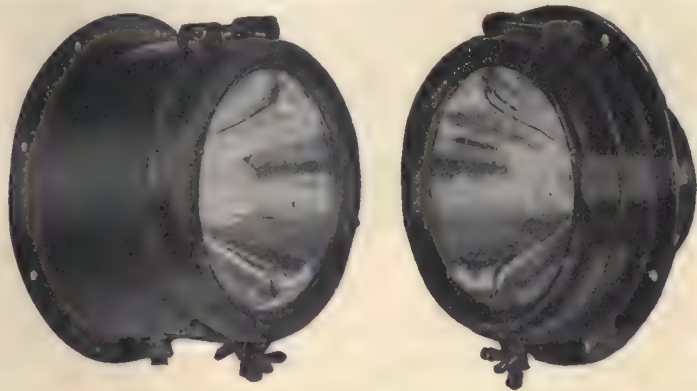
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



# ***"Golden Glow" Headlights***

*with the Famous "Golden Glow" Mirror Reflectors  
They Penetrate Fog*

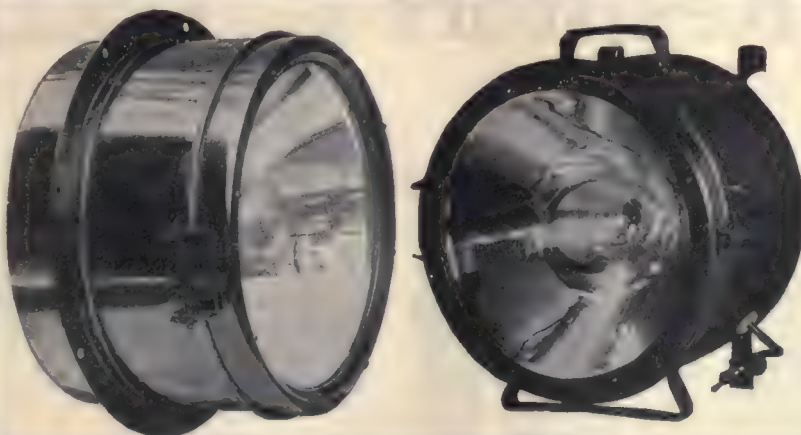
***"Golden Glow"  
for  
City Service***



"Golden Glow" Headlights are equipped with the famous "Golden Glow" mirror reflectors. Each reflector is moulded from special glass, ground to a true parabola, polished to a mirror finish and silvered as would be the finest French plate glass mirror. "Golden Glow" mirrors cannot be equalled and cannot be duplicated by any other manufacturer, because the machinery for doing this is special and patented.

The glass used in "Golden Glow" reflectors has a rich golden-green color which absorbs the ultra-violet, violet and other high frequency rays, thus projecting a beam of golden-yellow light which is non-blinding and wonderfully adapted to the penetration of fog, moisture and dust.

"Golden Glow" Headlights for city service are far superior to any other headlight to be had on account of the greater volume of light projected, their economy and their non-blinding features. This also applies to those for interurban service, which may be operated at a cost insignificant as compared with arc headlights.



***"Golden Glow"  
For  
Interurban  
Service***

*Allow us to Demonstrate a "Golden Glow" on your Cars*

## **ELECTRIC SERVICE SUPPLIES CO.**

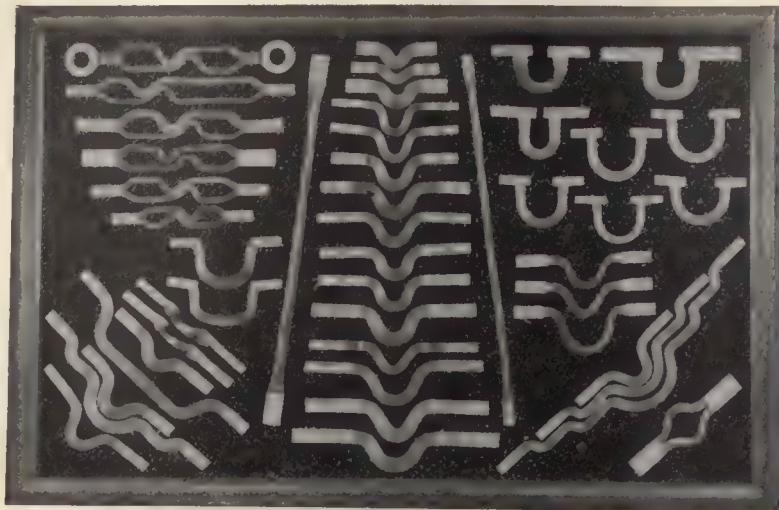
*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

NEW YORK  
50 Church Street

CHICAGO  
Monadnock Bldg.





There is no Shortage  
of  
**ERICO  
WELDED  
BONDS**

Just as the Erico Bond is making good its promises of service, so the organization behind the Erico Bond is making good its promises of delivery.

There is no shortage of Erico Bonds, despite the fact that thus far 1916 has been the best of the 16 years of Erico success.

**Dependable Bonds—Prompt deliveries**

**The Electric Railway Improvement Co.**

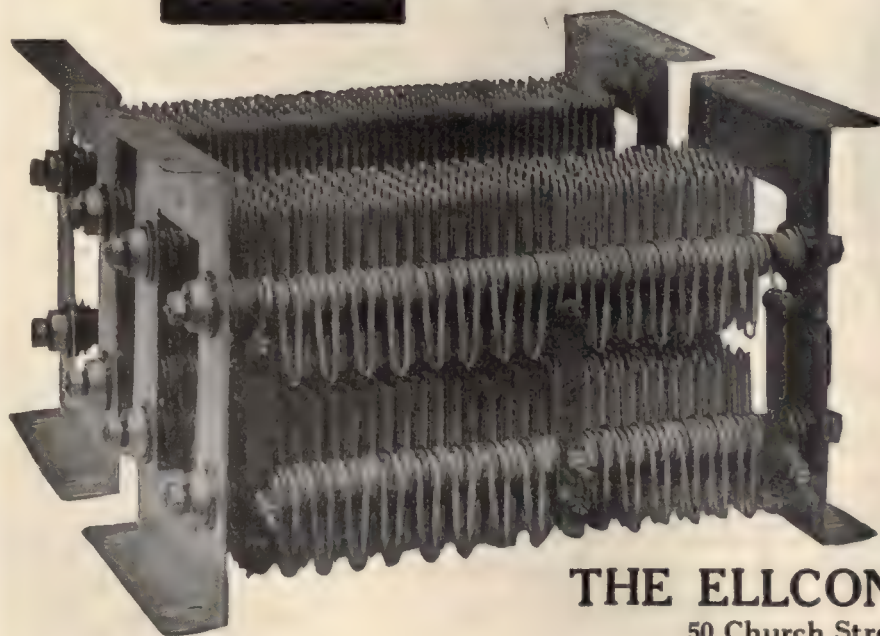
Cleveland, Ohio

*There's Percentage in Buying*

**FMB**

**Resistors**

**95% Jointless  
100% Troubleless**



Not because we say so, but because exacting railway conditions have proved them so. How can a drawn grid resistor be otherwise?

Drawn grids are never brittle, never non-uniform in cross-section, never strained by the expansion and contraction attendant on rapid heating and cooling. They are always lighter in weight and better in resisting rust and corrosion than cast grids.

And remember there are only five or less joints in a drawn grid to every hundred in a cast grid. You know what that means in eliminating trouble.

**THE ELLCON COMPANY**

50 Church Street, New York



# SOLDIERS THREE

Three tough, hard-fighting, efficient and reliable soldiers you can enlist to help you in the daily battle of keeping down operating costs.



## More-Jones Armature Babbitt Metal

The acme of high quality babbitt, known everywhere for its long wearing properties and the satisfactory service it gives in Armature Bearings under the most severe operating conditions.



## More-Jones V-K Oilless Trolley Wheel in the V-K Non-Arcing Harp

provide the best form of contact yet devised. The patented graphite-impregnated bushing of the wheel saves all lubricating expense and eliminates the insulating effect of oil or grease. The locking device on the harp prevents wear on pins and sockets—checks arcing—increases wheel mileage by improving current flow.

## More-Jones "Tiger" Bronze Axle and Armature Bearings

possess strength, toughness and low co-efficient of friction, perfectly combined. Due to pure metal skilfully compounded and cast by special methods, "TIGER" BRONZE is your best guarantee of long, efficient, reliable and economical axle and armature bearing service.

*Further information and prices on application.*

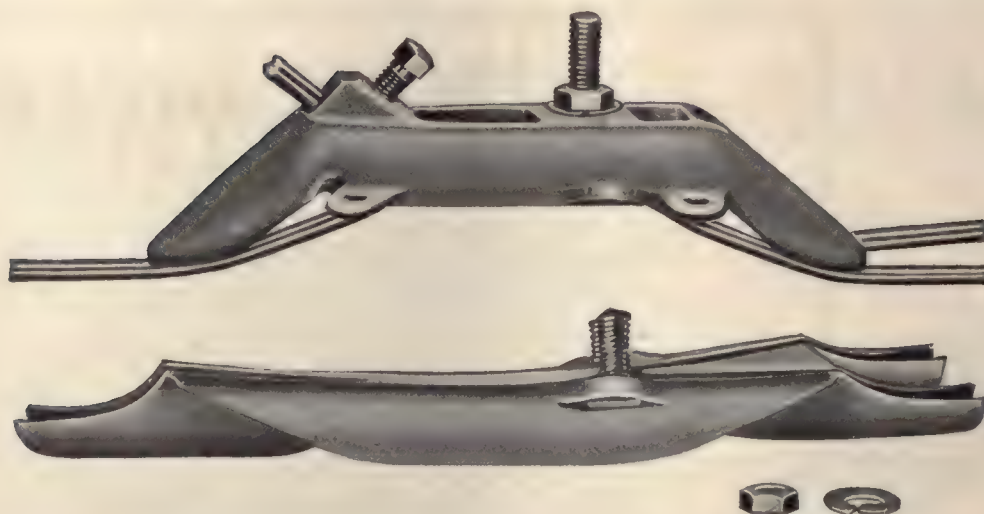
**More-Jones Brass & Metal Co.**  
**St. Louis, U. S. A.**

Manufacturers of

Trolley Wheels and Harps, Contact Springs, Motor Axle Bearings, Armature Bearings, Truck Journal Bearings, Air Compressor Bearings, Armature Babbitt Metal and Similar Products.







## Reduced Repair Cost

The G-E Form N trolley frog with renewable pan need not be removed from the wire in making renewal of worn parts. This means:

### Money saved—

The pan, only, need be bought and kept on hand as the sherardized iron body gets very little wear and will outlast many pans.

### Time saved—

In making renewals simply bolt on a new pan without removing the frog from the wire. No wires or tackle need be handled.

Practical linemen appreciate the time and labor saving features of the G-E Form N frog and the lessened expense of maintenance is gratifying.

*Prompt shipments from stock*

# General Electric Company

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.  
Charleston, W. Va.  
Charlotte, N. C.  
Chattanooga, Tenn.  
Chicago, Ill.  
Cincinnati, Ohio

Cleveland, Ohio  
Columbus, Ohio  
Dayton, Ohio  
Denver, Colo.  
Des Moines, Iowa.  
Duluth, Minn.  
Elmira, N. Y.  
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Fort Wayne, Ind.  
Hartford, Conn.  
Indianapolis, Ind.

General Office: Schenectady, N. Y.

ADDRESS NEAREST OFFICE

Jacksonville, Fla.  
Joplin, Mo.  
Kansas City, Mo.  
Knoxville, Tenn.  
Los Angeles, Cal.



Louisville, Ky.  
Memphis, Tenn.  
Milwaukee, Wis.  
Minneapolis, Minn.  
Nashville, Tenn.

New Haven, Conn.  
New Orleans, La.  
New York, N. Y.  
Niagara Falls, N. Y.  
Omaha, Neb.  
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Providence, R. I.  
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Spokane, Wash.  
Springfield, Mass.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
Youngstown, Ohio

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso  
Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, SEPTEMBER 30, 1916

No. 14

## THE REASON FOR A CONVENTION ISSUE

The question may be raised: Why does the ELECTRIC RAILWAY JOURNAL publish a special issue each year at the time of the convention? The reason is this: The plan was begun at the time when the association met in a different city each year, and the issue was devoted to an account of the railway system in that city. The purpose was to acquaint the delegates with the matters of railway interest there so that during their visit they could take them up more readily than if they had no such guide. During those years in which the convention has been held in Atlantic City, no such plan has been necessary, but the Convention Issue has been retained for an even stronger reason. This is because it enabled the presentation at one time of a review of the progress made in the art along some line which was particularly active at the time. Some of the subjects thus selected have been heavy electric traction, welfare work, interurban practice, city standards and public relations. In this way the industry has practically a series of extensive reports or text-books on each of these subjects in which the information is brought right up to the date of publication.

## WHY A CAR NUMBER THIS YEAR?

The car is a peculiarly fitting subject for the Convention Issue this year because operating men are showing an unusually keen appreciation of the relation of car design to profitable operation. In fact, at railway gatherings there is no topic more sure of reaching the mark than this one. Many of the best minds in the industry are at work devising new schemes for reducing weight, facilitating boarding and alighting, cutting down original cost and maintenance expense, saving energy, increasing speed, improving heating and ventilation, etc. When the margin of profit in the nickel fare was larger there was not the necessity for attention to these matters that there is now. Under present conditions the general design of the car as well as every detail must justify its choice according to most exacting standards. The popularity of the jitney has indicated one kind of transportation that is needed, particularly in congested sections. This rival will not have existed in vain if it has served to point out some of the desirable lines of progress in quick-service car design. Considerations of accident reduction have also radically affected car planning, as has also the need for reduction in platform labor cost. These and other influences are reflected in the descriptions and comment in this week's car number, which is the result of a sifting process extending over many months. Space

limitations forced the rejection of many interesting items of car construction, but it is believed that what has been selected gives a balanced and accurate summary of the present status of the electric railway passenger car.

## APPLYING THE YARDSTICK

The subject of public relations is inherently difficult of definition. It is apt to be up in the clouds of generalization. To be effective it must be brought down upon the ground of application and illustration. In the issue of this paper for Sept. 2, page 386, a tentative outline of public relations was printed. This has been well received as a contribution to a visualization of the subject. It may be said to furnish a crude yardstick by which achievement in promoting good will may be measured. A good opportunity to apply it is furnished by the description of the transformation which has come about in Kansas City during the past few years, the leading article in this week's issue. The "yardstick" indicates as the objects of establishing good public relations: "(A) To secure maximum patronage," and "(B) to secure good treatment and popular support." The story shows how sorely needed these things were in Kansas City a few years ago. But the sequel is encouraging. The public came to realize its intimate relation to its traction system, a consummation devoutly to be wished. To-day, if the famous Billy Sunday is to be taken literally, "The street car service is the best I've ever seen in any city where I held meetings"; at any rate, it's good service, and the people like it, use it and boost it.

## THE NEW YORK SYMPATHETIC STRIKE

The sympathetic strike in New York, called to bolster up the already defunct street railway strike, promises to be as flat a failure as the cause which it was intended to assist. The workmen in most lines of industry are making too much money to look with favor upon a plan to stop work on the plea that in some way or other, not clearly explained, it will help the labor leaders to establish a union on the transportation lines. But success for the sympathetic strike, in the opinion of most people, would be just as fatal to the consummation of the demands of the labor leaders as would be its failure. If the building trades, the longshoremen, the garment makers and all of the other unions of the city can be called out because of a labor dispute on the transportation system, it follows that with the transportation labor organized the carmen would be called out on a sympathetic strike in the case



of a dispute in any one of these other trades mentioned. In other words, the citizens of the city would never know when they would find the cars running. Each time there was a dispute in the garment trade, the cigar trade or in any other industry with organized labor, which could not be settled in the usual way, the citizens of New York would be deprived of transportation until the employers of that line of business decided to give in. Such a condition of affairs, of course, would be intolerable, but it is the logical sequence to the plan of the sympathetic strike which Messrs. Fitzgerald, Bohm, Frayne and others are attempting to inaugurate in New York.

#### THE MANUFACTURER'S PLACE IN THE AMERICAN ASSOCIATION

What is to be the function of the new manufacturing members of the American Electric Railway Association? The answer to that question should be set before every manufacturer in the electric railway industry. Not a great deal has been written on this subject. The need for the new membership and the reasons why manufacturers should join the association have been expounded more generally than the question of what functions the manufacturers who have joined can now perform.

The need for an amalgamation of forces was set forth strongly by President Henry, who said: "The good of the industry requires earnest and constant effort, to the end that conditions which are working serious injury to owners, operators and manufacturers alike, may be corrected." Therefore, the American association amended its by-laws at Chicago last February so that it might admit to membership companies engaged in the manufacture and sale of electric railway material upon the same basis and with exactly the same rights and privileges and charged with the same duties and obligations as railway company members. The Chicago amendment opened the way for unity of action, and the membership committee has done its work well. Aggressions against the electric railways as a class can now be met by a united body representing both operating and manufacturing branches of the industry.

The manufacturers were not invited to join as a group, but by companies, just as the railways have joined. In response to the invitation 200 manufacturing member companies will this year, for the first time, be privileged to attend the convention on the new basis, that of equal partnership in the association. The invitation to join was accompanied by President Henry's discourse entitled "A United Industry." In that, the chief executive of the American association set forth to the prospective manufacturing members, so far as was possible at the time, an outline of what their membership would mean and what their function would be.

Those who are charged with the responsibilities of administering the association's affairs should now set before the manufacturers who have joined and those who should join, the scheme of organization activity

to which the manufacturer may bend his efforts. The preliminaries have been finished, the industrial forces are united, now how can the new members perform their work? The ELECTRIC RAILWAY JOURNAL believes that the objects, motives and aims which prompted the Chicago amendments should control in deciding how the future activities of the manufacturing company members shall be guided. Those who fathered the Chicago resolution saw the need for manufacturing members and that need was greater than any probable increase in revenue. The men at the helm had in mind definite tasks to be performed by owner, operator and manufacturer working hand in hand.

This year's convention will serve very largely to establish the basis on which the joint work will be prosecuted during the next few years. The manufacturers are going to attend the convention in a spirit of expectancy. They have become members and are willing to accept duty, but largely must look to the present association executives to point the way.

Since the major part of the active association work is done by committees, manufacturers and their assistants will be chosen for appointment to committees which can best utilize their resources and abilities. There are, of course, certain committees, such as the committee on operating rules, which deal with subjects of interest only to the operator. To these the manufacturer will not expect appointment. Contrasted with these are such committees as those on equipment, block signals, way matters, power generation, power distribution, and many others, both standing and special, on which manufacturers' representatives as such can render excellent service. Membership in these committees will be eagerly sought by the manufacturers. They will seek it with a true business spirit, reinforced by a firm desire to help the association to a determination of what is best for the industry.

Another important question is, will the manufacturers in the future have an organization through which they can express to the industry and to the parent association their ideas as manufacturers? An association of member company manufacturers might be formed, and it might request a charter from the American association, although it is obvious that the kind of work which such an association could profitably do would have to be different in scope from that of the other affiliated bodies. But would such a plan divert the energies of the manufacturers from the main object which prompted the Chicago amendments? Might it not hinder the unity of work? If so, could not the ideas of the manufacturers as a group be expressed through a large standing committee? This committee could be organized on much the same basis as the present convention committee, and it might perform similar functions as well.

By handling the purely manufacturing problems through a large manufacturers' committee rather than by an affiliated association, the interest of the manufacturers would not be diverted from the big work of the American association and there would be no complica-



tions arising from the membership and active work of manufacturers in the present affiliated bodies.

We believe that the doubtful points raised will be answered at convention time.

#### FINANCIAL RELIEF FOR BOSTON?

The most serious problem before the electric railway industry to-day is admitted by all to be that of securing greater net receipts so as to make more nearly possible a fair return on the investment. Under present franchise conditions most electric railways are certainly not earning a fair return, and it is a momentous question how to bring about a reduction of present burdens or to secure authority for increased charges for service, or both. It is true that forty electric railways, as shown by a recent tabulation of the information bureau of the American Electric Railway Association, have been granted increased fares in some form or other during the last three years, but the public as yet is far from being educated up to the point of a general appreciation of electric railway revenue needs. Likewise, although some regulatory bodies have urged upon the public a more sympathetic co-operation in the matter of reducing expenses and eliminating unnecessary operating burdens, public opinion has been slow in permitting tangible evidence of such co-operation.

Greater relief along the line of increased receipts and reduced burden can come only as a result of persistent publicity concerning utility needs, and every well presented fare-increase case is likely to prove educative to the local public. In this very issue we are mentioning two rate cases that on account of their exhaustive presentation cannot but help the general cause of successful electric railway operation. In one of these, the Bay State Street Railway case, which was reported in detail in the issue of Sept. 9 and is summarized in the communication columns this week, the company failed to secure a general fare increase to 6 cents, but the clear-cut pronouncement of the commission in regard to the public responsibility for certain onerous operating burdens should cause not a few citizens to readjust their thinking along saner lines. The other case, that of the Boston Elevated Railway, presents questions of financial needs upon which as yet we have officially only the company's point of view, but one can hardly see how the equity of the desired relief can be denied.

The outcome of the Boston Elevated case will be awaited with interest, for the financial condition confronting the company is of such a peculiar character that the public responsibility therefor, if admitted, will probably result in more immediate and more concrete assistance than the mere suggestion of future co-operation. Owing to the increase in public demands, the Boston Elevated Railway has become more and more confined by restrictions imposed by public order. Under ordinary circumstances a Massachusetts street railway in need of additional net revenue may file a proposed fare revision with the Public Service Commission, but the Boston company by legislative enactment is restricted to a 5-cent fare until 1922, and any

relief must come from the Legislature. Owing, however, to the increased cost of labor and materials, and to the extensions of service and added permanent investment which the company felt compelled by the pressure of legislation and public opinion to make more rapidly than the business warranted, a 5-cent fare with universal free transfers is not now sufficient to pay even a 6-per cent dividend on the capital stock, which would mean a return of less than 5 per cent on the cash actually paid in by bondholders and stockholders. Without such a dividend being probable new stock will not be salable at par; under the Massachusetts law new stock cannot be issued at less than par, nor can any more bonds be issued until additional stock is put out. This increasingly untenable position in which the company has been placed has been in the last analysis caused by the requirements of the public, and it is certainly not unfair to expect remedial legislation from the State and aid from the city as well.

The section of the company's brief that is of greatest present interest naturally has to do with the plans suggested by it for improving its financial condition. There being no relief in sight from reduced operating expenses or increased business, the company strikes at the heart of the situation when it asks that some arrangement be made to assure a 6-per cent dividend for proper and efficient operation and that the rate of fare be increased whenever the company cannot earn this dividend after meeting all regulatory requirements. Various detailed suggestions are made, but the main ideas are that the car riders of Boston shall henceforth meet more closely the cost of the service rendered to them and that the communities benefited thereby shall contribute toward the cost of improved transportation. Needless to say, these are fundamental precepts of modern utility operation whose justice and practicability have been recognized in other cities, and there is no valid reason why the investigating commission should not be able to combine the various suggestions of the company into a workable plan along these main ideas.

One noteworthy point before we close. It will be recalled that in the recent Bay State case the Massachusetts Public Service Commission held that every possible means of increasing the business and raising the efficiency of the system should be exhausted before rates should be raised. If such a principle is to be applied by the special commission to the Boston Elevated case, the company should make a most creditable showing. While we have not included in our abstract of the company's brief the descriptions of its various moves toward increased economy and efficiency, owing to the prior treatment given to such topics in this journal, we appreciate their importance in the case now pending in Boston, and we desire to emphasize the fact that only the increased cost of labor and materials has made it impossible for the company to show in its operating statements the reductions in cost that it has secured through improved methods and greater efficiency. In regard to this point also, therefore, the company has a reasonable basis upon which to ask for financial relief.



[illegible]



# Kansas City Railway Gains Public Favor

An Account of the Steps Taken by the Kansas City Railways to Change Adverse Public Opinion, Bring About Political Peace and Establish Conditions Which Would Permit Refinancing on a Sound, Permanent Basis

**A**FTER a five-year storm of querulous criticism and destructive regulation the Kansas City Railways, of Kansas City, Mo., and Kansas City, Kan., emerged practically over night into the sunshine of public favor and political peace. Broadly, the change was due to the fact that the public had grown tired of the chiding of the press and the fault-finding of the politicians. Business interests also found that the abominable treatment accorded the outside capital invested in Kansas City's public utilities had spread broadcast and that the financing of any project in or about Kansas City had become almost impossible. And so the story goes, as it has gone, and is going, in a number of other communities bound upon destroying the investment in their public utilities. While it is impossible to outline in minute detail how this radical change in sentiment was brought about, the salient features of the process of evolution are presented in this article.

## HISTORY OF THE CONTROVERSY

Early in 1909 maturing bond issues of the subsidiary companies of the Metropolitan Street Railway compelled the management to negotiate for a new blanket franchise in order to make complete refinancing possible. Although the existing franchise would not have expired until June, 1925, or sixteen years later, it was impossible to negotiate on reasonable terms the sale of new bonds which would mature with the existing franchise. In April, 1909, at the suggestion of the railway management, the City Council and the City Utilities Commission employed expert accountants to investigate the railway's financial condition and to determine the amount of money that was being expended for operation, and that necessary to provide for equipment and accommodations to insure comfort, convenience and service for the public.

Immediately upon opening these negotiations there sprang up opposition to granting an extension to the franchise which had sixteen years to run. In the months that followed, however, a franchise agreement was drafted which was satisfactory to the business interests of Kansas City, and the railway company. The terms of this ordinance were bitterly fought by some of the local newspapers, but to combat their position, Bernard Corrigan, then president of the Metropolitan Street Railway, had the franchise contract printed in pamphlet form and distributed to the public. He accompanied this pamphlet with a summary of the benefits to the city, which included a reduction in fares. The city was to receive 50 per cent of the net earnings; it was given the right to audit and regulate the salaries

of railway employees, to control additions to capital account, and to purchase the property at the expiration of the existing franchise. There were many other advantages to the city in the way of track extensions and the purchase of rolling stock. Certain newspapers continued to impugn the motives of the company and the controversy, which was to continue for a period of five years, was begun in earnest. Later the ordinance was introduced in the City Council, where it was amended in an acceptable manner and submitted to the voters on Dec. 16, 1909. Although the franchise had been passed by the City Council and approved by the Mayor,

the opposition of the press caused its rejection by a large majority in a heavy vote.

With the possibility of obtaining a new franchise definitely settled, the management was still confronted with the problem of refinancing. While the earnings at that time permitted maintenance and operation to continue, extensions and improvements could not be financed. Chafing under the continued attack of the press and a public disgruntled by the failure to make needed improvements and extensions of service, the railway company lapsed into a deplorable state both financially and phys-

ically. In June, 1911, it became apparent that the requirements of the existing franchise would not meet the demands of the public in regard to service and improvements. Much new capital was necessary to make extensions to provide for the phenomenal growth of both Kansas City, Mo., and Kansas City, Kan. The government census of 1910 showed that the population of these two cities had increased approximately 52 per cent over what it was in 1900, and every indication pointed toward a continued growth in the same proportion. Since modifications in the existing franchise were absolutely necessary, as well as an extension of the time limit to make it possible to obtain money for these improvements, and the city had refused to grant a new contract, a receivership offered the only recourse. Upon the petition of the Kansas City Railway & Light Company, the holding company of the railway and light properties, receivers were appointed June 30, 1911. This action disclosed the financial difficulties of the company and prevented an immediate foreclosure of the various underlying mortgages, with the consequent probable disintegration of the whole system. This situation, of course, also made it impossible to furnish adequate service and the system continued in disfavor with the public.

The foregoing outline of the Metropolitan Street Railway's vicissitudes brought it up to the turning point

## Brighten the City Where You Are!

Billy Sunday says:

*"Bless the Street Car men.*

*"I've noticed how quickly the tabernacle is filled  
I've noticed how quickly the crowds are carried away  
after a meeting.*

*"I'm glad for this spirit of co-operation by the Street  
Car Company.*

*"The Street Car SERVICE is the BEST I've ever seen  
in ANY city where I have held meetings!"*

*And Mr. Sunday has held great meetings in practically  
every big city in this country. So he KNOWS  
what he is talking about. He KNOWS good service,*

GAINING PUBLIC FAVOR—WHAT AN ADMIRER SAYS OF  
KANSAS CITY SERVICE NOW



## CAR COMPANY HAULS 16,000 PERSONS FROM THE TABERNACLE IN 20 MINUTES

Ingenuity of Traffic Experts Taxed to Have Rolling  
Stock at Right Time; Electric But-  
ton Solves Problem.

Speaking of records—

It took the Kansas City Railways company 20 minutes to haul away 16,000 persons from the Billy Sunday tabernacle last night. It cost the 16,000 who rode the street cars \$1,600 to attend the meeting. There were 5,000 others who couldn't get in, which made \$500 more spent for car fare. To handle the crowd the ingenuity of the railway officials has been taxed.

It fell to the lot of W. C. Harrington, superintendent of transportation to solve the problem. ~~that day Harrington didn't leave Eighth~~

GAINING PUBLIC FAVOR—A NEWSPAPER TRIBUTE TO KANSAS CITY'S PRESENT RAILWAY SERVICE

of one of the bitterest controversies in utility history. At the time receivers were appointed it appeared that Kansas City publicly and politically was bent upon the complete destruction of its one-time prosperous public utility. Despite the fact that the railway system was in the federal court it was still subject to bitter attacks by some of the newspapers and the public which had fought it for years. These newspapers demanded over and over again that the property be taken out of the hands of the receivers and that the company be compelled to transact its business without a franchise. One of the first moves made by the Federal Court was to determine the railway's capital requirements to meet the public demands. The service had retrograded, the cars were in need of repairs and the lines in various parts of the city needed rehabilitation. In the outlying districts people were clamoring for extensions because

they, for the most part, had built their homes in the belief that the railway lines would be extended into their districts.

As the result of all this, Federal Judge Hook gave an opinion in January, 1912, that the physical rehabilitation of the street railway property was impossible without a financial rehabilitation. It was also pointed out by the Court that money could not be obtained to make the extensions demanded, to purchase new cars and remodel the old ones, to build up the trackage, to assist in the construction of viaducts, and to do much other building work unless arrangements were made to secure outside money. It was also the opinion of the Court that outside capital could not be obtained without new contractual relations with the city. The Court then directed the receivers to open negotiations with the city, and it, in turn, agreed that a new contract was necessary, but that a revaluation of the property should be made before the preparation of a new franchise would be undertaken. These negotiations were in progress at a time when the public had become more or less apathetic, although the antagonistic press continued to find fault.

Accordingly a physical valuation of the property was made in 1912 and accepted after some delay by both the city and the receivers, and immediately the work of preparing the form of contract was undertaken. It was not until the spring of 1914, however, that this ordinance assumed practically final form, and during its preparation a policy of fullest publicity was adopted which had much to do with regaining public confidence. In the past the railway company had made the mistake of taking an active part in politics and of conducting its operations behind closed doors. During the negotiations a municipal election was held, and as an indication of the then existing pulse of the public, the officers, who had practically perfected the new public utility contract ordinance, were returned to office by the greatest plurality in the history of the city. In June, 1914, the ordinance was completed and passed almost unanimously by the City Council, and in the July following it was approved by a large majority vote of the people. This vote of public confidence disarmed the antagonistic press and the remaining opposition and began the era of satisfactory public relations which the present management is making every effort to maintain.

The explanation of this practically over-night change in public sentiment is somewhat difficult. To begin with, the public, which had followed the leadership of certain local politicians and the press, both bent on ruining the railway company, had grown tired of the senseless controversy. To convert completely those who were in this frame of mind the railway's first important step in the way of publicity was to convince them that improvements and extensions could not be made unless a new franchise was granted. To give further force to this suggestion the business interests had found that it was practically impossible to obtain outside capital to promote a new project because of the treatment the city had accorded the investments in its public utilities. The public utilities securities were held broadcast and Kansas City's reputation for destroying invested capital had been spread by these security holders. Aside from the publicity given to the effect that this long-drawn controversy had had on obtaining capital, the active co-operation of all commercial associations was sought, and their support was an important factor in molding public opinion. These associations were convinced that the interests of the community and private business were one with the interests of the public utilities, and if Kansas City expected to restore confi-



GAINING PUBLIC FAVOR—CARTOONIST'S IDEA OF FRANCHISE  
OPPOSITION IN KANSAS CITY



dence in the minds of outside investors it would have to come to the aid of its practically ruined public utility property.

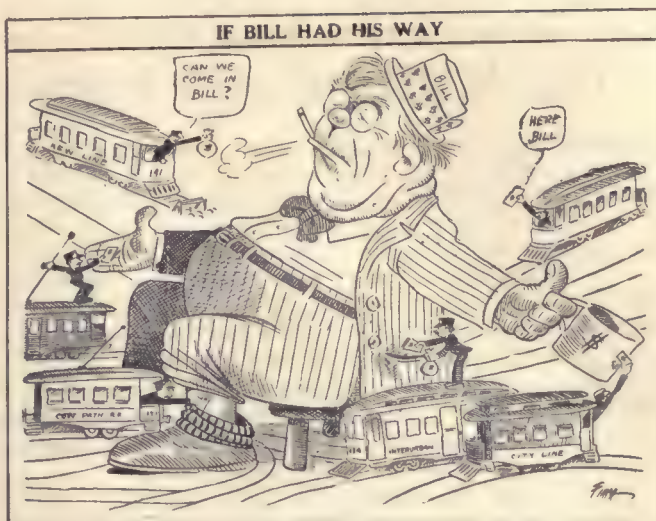
# PUBLICITY CAMPAIGN PRECEDING FRANCHISE ELECTION

For the six weeks prior to the vote on the franchise, which was held on July 7, 1914, a most active campaign of publicity was conducted. This was necessary to refute the arguments of the *Kansas City Star and Times*, which had led the opposition through the five-year controversy. The plan of publicity followed during this campaign was along two lines, one through the agency of two of the local newspapers that championed the cause of the street railway, and the other through speech-making tours through the various voting precinct headquarters. The newspaper campaign took the form of challenging every statement made by the opposition papers and refuting every argument made by opposition politicians. It also constructively presented the case of the street railway company from the standpoint that the city's credit among outside investors had been greatly injured and the city could not expect to make marked industrial progress until its reputation for fair dealing had been vindicated by establishing the right relations with its public utility. This publicity campaign was conducted in the form of advertisements, editorials and articles. The speech-making campaign in the 200 or more voting precincts extended over practically the same period and these two lines of activity soon began to produce results.

One of the most compelling arguments in favor of voting for the proposed franchise was that it included extensions and additions to the property which would cost more than \$2,000,000. This, of course, was of particular interest to the laboring classes. Furthermore, the adopting of the franchise was the first step toward municipal ownership, because under the amortization provision of the new ordinance the city would ultimately own the property. Aside from the direct and indirect arguments for the franchise the newspaper champions of the railway company published from day to day the names of business men, professional men and men in any walk of life who had announced themselves as favoring the franchise. This appeared under the title of an honor roll and it was of great value in influencing public opinion for the franchise. In connection with this campaign it is also interesting to note that as many as six or eight columns of material for and against the franchise appeared in each issue of the local newspapers. At the close of the six week's campaign the public had had its fill of the street railway franchise controversy and it was more than glad to cast a favorable ballot in order to get the question out of politics and the newspapers.

## RAILWAY TAKEN OUT OF POLITICS

When Philip J. Kealy assumed the office of president of the Kansas City Railways he gave out a public statement to the effect that the ownership of the street railways had changed and that the company and the city had taken charge as partners. Quoting further from this statement, Mr. Kealy said: "It means a new order in Kansas City street railway affairs, built upon the recognition of mutual interests of the city and the company in the operation of the company. There will be no dodging of issues nor quibbling over demands or orders of the Missouri or Kansas public service commissions as to service." \* \* \* "It is planned to conduct the street railway property in as economical a manner as the needs of the traveling public and the welfare of its employees will permit. As to the welfare



GAINING PUBLIC FAVOR—ONE NEWSPAPER'S VIEWS OF FORMER TRACTION POSSIBILITIES IN KANSAS CITY

of its employees—it plans to have much to say in the future. As the company grows, so shall they grow.

"Of that which is history in street railway affairs, this company had naught to do. Situations arose upon which men justly agreed and disagreed. But they are of the past. Surely, resentment because of this cannot be cherished against the incoming management. Such conditions shall not arise under the present control, which will regard every person in Kansas City as friendly and refuse to believe otherwise until the contrary is proved.

"The Kansas City street railway system is an intricate one. Situations may arise in the immediate future that will try the patience of the company as well as of the public. Time will be required in perfecting complete reorganization and carrying out plans for betterment. Until they are perfected the management can only ask the public to wait. As rapidly as a definite plan has been arranged for the betterment of the public or employees it will be made public. The management wants the co-operation of the press, the business interests through the Commercial Club, the police department and the people as a whole in an effort to make



GAINING PUBLIC FAVOR—THE KANSAS CITY VOTER ABOUT TWENTY-SEVEN MONTHS AGO



Kansas City's street railway system the best in the land. As time goes on this co-operation will be sought in more detailed ways."

#### WORK OF PERMANENT PUBLICITY DEPARTMENT

Immediately upon completing the reorganization of the Kansas City Railways President Kealy organized a publicity department solely for the purpose of obviating the difficulties into which the policy of the old company had led it. This department is under the direct supervision of Mr. Kealy and it has the active co-operation of all the department heads of the company. E. B. Atchley, formerly editor of one of the local newspapers, was appointed publicity agent, and associated with him are an assistant and a stenographer. The formation and purpose of this department were announced in all of the local newspapers, and since its organization all reporters call on the publicity agent for all the news regarding railway matters.

Shortly after the organization of the publicity department it began the publication of a monthly employees' paper, and, as outlined in the first issue: "It is intended to be the medium for the interchange of ideas between the men who constitute the brains, the bone and the sinew of this company; it is to be their paper; it is intended that each employee shall receive a copy of each issue, and it is hoped he and his family will read it carefully." Correspondents to the *Railwayman*, as this publication is known, have been appointed in every department headquarters, and they are paid \$5 a month for furnishing personal news regarding the employees in their departments. Copies of the publication also are sent to all the school teachers, to the public library and its branches, and to every public reading room. Although there is some material included of interest to the general public, the *Railwayman* is intended primarily as a railway family newspaper.

From its inception it has been the policy of the publicity department to supply the newspapers and the public with all the information either may care to know about the operations of the company. Every corporate affair is of public interest under the new franchise. Operation is under joint control and five of the eleven directors are representatives of the city, hence it is especially appropriate that the outside door of the publicity department should be always open to the public. Although at first some of the newspapers were skeptical of this plan of publicity, they have gradually learned that there is nothing secretive about the publicity department and that they may depend upon it for everything in the way of railway news. All changes in service are advertised prior to their becoming effective, and from time to time feature articles are prepared and furnished to the newspapers regarding construction work, cost of improvements, etc. Recently President Kealy made an extensive study of the future development of traction facilities in Kansas City, and this was put into shape for the local newspapers which ran it with illustrations as a feature article. Experience has so far demonstrated that there are innumerable human interest stories regarding the Kansas City street railway operations and that it only requires a newspaper "nose for news" to unearth them.

In connection with accidents the publicity department makes it a point to see that reports of all the facts are accurate. In many instances it has been found that had the reporter been left to obtain his information from general sources, an account of the accident would have been published which would have been decidedly detrimental to the railway's interests, when, as a matter of fact, it was not to blame in the least. Moreover, the department has been able to guide public opinion

where it's and the public's interests were in common, but it always makes a practice of giving both sides of any case. In other words, the publicity department sees that the newspapers and the public receive first-hand information and not rumors or hearsay, as nothing is kept from them.

#### WELFARE WORK IN THE ORGANIZATION

While much time and attention are being given to maintain that public confidence which was so apparent at the franchise election, President Kealy has not neglected the welfare of the company's employees. The *Railwayman* has in a large measure built up a fine spirit of goodfellowship among the employees in that it has formed a clearing house for ideas and the means of transmitting wholesome news items that occur in the departments of every railway system. Through it such questions as public good will, courtesy and the railway problems are presented from time to time for the information of employees, thereby fortifying them in their discussions with the public. The departmental baseball league and a season's schedule of games afford a means of contact for those who are enthusiastic about athletics. A fraternal aid and protective association organized among the employees provides for them and their families in case of illness or death.

One of the latest moves in the way of welfare work was the establishment of a loan bureau through which employees are loaned money without interest, and the appointment of a lawyer whose services are at the disposal of all the company's employees without cost to them. It is this attorney's duty to see that their legal rights are respected and that they are not imposed upon by unscrupulous lawyers or harassed by trumped-up demands. It is not the intention of the company to aid its employees in avoiding just debts, but it is its purpose that the attorney work out a satisfactory settlement or arrangement for payment. Shortly after this attorney's appointment it was discovered that there were numerous cases where the necessities or misfortunes of employees had compelled them to borrow money from ruthless money lenders. In order to obviate this in the future, the establishment of a fund has just been announced from which deserving employees in times of financial stress, may borrow money without interest.

Other activities which have been developed among employees of the railway company include a company band, and only recently a family jubilee of all the employees was held at the railway's expense. The spirit of the employees and the way they are receiving the welfare work undertaken by the management, was amply expressed by the fact that 11,000 persons attended this family jubilee. As matter of fact this response to the company's invitation literally swamped the committee on arrangements. Every department head has taken hold of this welfare work with zest and the response with which it is meeting among the employees has been a great satisfaction to the management. Moreover, this spirit among the employees has been of great assistance in maintaining the proper kind of public relations.

The street railways of Germany, according to the *Zeitschrift für Kleinbahnen*, have taken a very active part in the handling of troops of all kinds since the outbreak of the war, acting as feeders to the State railways. Although only about 3100 miles of track is included by the 300 street railway companies in Germany, more than one-half of the 52,000 street railway employees were called to arms before December, 1915, so that the substitution of platform men could be made in only a limited manner.



# Boston Elevated Seeks Financial Relief

Hearings Begun by Special Commission to Investigate Need of Additional Net Revenue—  
Proposed Remedies Look Toward Assurance of 6 Per Cent Dividends on Stock

PROBABLY the most important set of hearings in the operating history of the Boston (Mass.) Elevated Railway opened at the State House, Boston, on Sept. 25, for the consideration by a special recess commission of the company's plea for financial relief as advanced in a letter to Governor McCall May 22, 1916. The commission is composed of Lieut.-Gov. Calvin Coolidge, presiding; the president of the Senate, the speaker of the House, six members of the Legislature, and the members of the Massachusetts Public Service Commission and of the Boston Transit Commission. Frederic E. Snow of Gaston, Snow & Saltonstall, Boston, opened the case for the company, presenting an eighty-six-page brief and about thirty exhibits. It is expected that the hearings will occupy several weeks. The commission is required to report its findings to the Legislature by Jan. 15, 1917.

## INVESTMENT OF THE COMPANY

The Boston Elevated Railway was incorporated by Chapter 548, Acts of 1894, and in 1897 it leased the West End Street Railway. Since that time it has operated the entire street railway system of Boston with the exception of the lines belonging formerly to the Lynn & Boston, and now to the Bay State Street Railway. The permanent investment in the system on June 30, 1916, according to the company's brief, amounted to \$116,022,060. This means the cost of physical property only, such as railway, equipment, land, buildings, etc. It includes not only the property owned by the Boston Elevated and the West End lines, but also the subways and tunnels owned by the city of Boston. On the same date, June 30, 1916, the capital investment, exclusive of premiums, was \$113,832,145, this being the par value of the stocks and bonds of the Boston Elevated and the West End companies, as well as the expenditures by the city for subways and tunnels and the value of leased lines.

The city of Boston furnished the capital for all the subways and tunnels except the Cambridge subway, and leased them to the company for a rental intended to be sufficient to pay the interest on the investment, and ultimately, by means of a sinking fund, to repay to the city the original cost. The capital for additions to the surface lines, with the exception of the lines leased from the Bay State Street Railway, was provided by the sale of bonds and stock of the West End company, upon which the elevated company pays the interest and dividends under the terms of its lease. The capital for the construction of the elevated lines, the Cambridge subway and the East Cambridge extension, and for the equipment of these as well as of the subways and tunnels owned by the city, was provided by issues of bonds and stock of the elevated lines.

The above-stated amount of the capital investment, the brief says, does not include a single dollar of water or any allowance for franchises or other public rights. It represents the actual cost of the property devoted to the public use. As far as the outstanding bonds and stock of the West End Street Railway and the Boston Elevated are concerned, the issue of every bond and every share of stock has been approved by the Public Service Commission, or its predecessor, the Railroad Commission, and, with the exception of the \$6,400,000 of preferred stock issued by the West End in 1887, every share of stock has been approved by the Public Service Commission, or its predecessor, the Railroad Commission, and, with the exception of the \$6,400,000 of preferred stock, every bond and every share of stock has been paid for in cash, and the proceeds expended with commission approval.

## SUGGESTIONS FOR RELIEF

An increase in fare.

Adoption of zone system of fares.

Charging for transfers.

Establishment of inclosed areas at transfer points where practicable, so as to reduce number of paper transfers.

Elimination of 8-cent check.

Purchase of Cambridge subway by the State and its rental to the company.

Temporarily charging off depreciation against premiums paid in on stock and bonds.

Return of \$500,000 deposited with the State, so that it will be available for ordinary capital purposes.

Reimbursement for subway rentals.

## LIMITATION ON NEW CAPITAL ISSUES

According to the brief, the elevated system requires in the near future from \$5,000,000 to \$7,000,000 of additional capital to pay for additions and improvements which have already been made or are in contemplation. Up to June 30, 1916, the company had expended for capital purposes \$2,049,351 in excess of the amount for which capital has been authorized. The money for this expenditure was borrowed temporarily and should be capitalized.

The brief states that on June 30, 1916, the outstanding elevated bonds amounted to \$26,586,000.

The par value of the outstanding capital stock was \$23,879,400 and the premiums paid in thereon by the stockholders were \$2,707,428, making an aggregate of \$26,586,828, or only \$828 more than the outstanding bonds. The company cannot, it is said, under the laws of the State, issue any more bonds until it has issued additional stock, and it cannot issue any additional stock because it cannot issue stock at less than par. The present market value of the stock is only \$73 a share, although it sold in 1901 as high as \$190, and in the last ten years has ranged from \$159 to \$65.50.

As before stated, the company now requires additional capital, but unless it can obtain the money by short term loans it has no course open. It is deemed impossible to obtain sufficient money by this method, but even if this could be done it would probably be at an excessive cost, and would leave the company at the mercy of changing financial conditions. Such a method of financing was disapproved by the Public Service Commission in the Middlesex & Boston rate case.

The company takes the point of view that to enable it to furnish such adequate transportation facilities as the public may reasonably require, its stock should be



salable at not less than par, and there is no reason to suppose that its stock will be salable at that price unless its earnings are sufficient, after making such provision for depreciation as the Public Service Commission may determine, to pay dividends at the rate of at least 6 per cent per annum, which is only 5.3 per cent on the money actually paid in by the stockholders on account of the premiums. Further, there must be some reasonable assurance that no additional burdens or requirements will be placed upon it which will jeopardize the payment of such dividends.

For many years the stock of the elevated company sold far above par, though paying only 6 per cent dividends, but the high price during that period was due to a large extent to the expectation that the future earnings would warrant dividends in excess of 6 per cent. The possibility of dividends in excess of 6 per cent, however, is said to be at the present time too remote to have any effect on the value of the stock. The company has never paid dividends in excess of 6 per cent, and in the last three years the payments were 5, 5.5 and 5 per cent.

Dividends at the rate of 6 per cent mean a return of only 5.2 per cent on the par value of the bonds and stock of the Boston Elevated and of less than 5 per cent on the cash actually paid in by the bondholders and stockholders. That is, a full year's interest on the bonds outstanding on June 30, 1916, would be \$1,195,300, while 6 per cent on the stock would require \$1,432,764, making a total for interest and dividends of \$2,628,064, which is 5.2 per cent on \$50,465,400, the par value of the outstanding bonds and stock, or slightly less than 5 per cent on \$52,844,423, the amount of cash actually paid in. This rate of return, the company notes, is substantially less than the rate which has been generally recognized as fair or which is essential to attract new capital. It adds that hitherto Massachusetts corporation stocks have sold at a price yielding a relatively low income return because they were non-taxable, but this advantage has been removed by the 1916 income tax law. This reduced the differential of from 1.75 to 2 per cent in favor of Massachusetts stocks to 0.6 per cent, which means that the purchaser of Massachusetts stocks will insist upon a higher income yield than formerly.

#### CAUSES OF PRESENT FINANCIAL CONDITION

The company's present financial condition is due principally to three causes: (1) The increase in the cost of labor and materials; (2) the enormous increase in the permanent investment at a much greater rate than the growth of business warranted, and (3) the extension of the length of rides in connection with the free transfer system, with a disproportionate increase in revenue.

##### 1. Increased Operating Costs:

For the year ended June 30, 1916, the gross revenue of the company was \$18,781,327, which was paid out as follows:

For operating expenses.....	\$12,079,996
Taxes .....	1,043,042
Fixed charges or return on investment, including railway and subway rentals, interest and dividends at 5 per cent on elevated stock.....	5,634,644
Miscellaneous items .....	13,846
Total .....	\$18,771,528

This left a surplus of about \$10,000, and the company failed by \$228,000 to earn its dividend of 6 per cent. Compared with 1915, the gross income increased \$894,778 and taxes decreased \$26,147, making a total gain of \$920,925. This was offset, however, by an increase in operating expenses amounting to \$792,012 and in

fixed charges of \$129,965, which included the dividend at the reduced rate of 5 per cent, or a total of \$921,977. The increase in gross income was mainly due to the fact that the company carried 17,160,457, or 4.955 per cent, more revenue passengers in the 1916 fiscal year than in 1915. This increase was much greater than the average rate, and represents a total of but 110.645 per cent over 1897. The increase in population since 1897 has been from 831,608 to 1,244,645, or 49.667 per cent.

There is no likelihood, the company's brief states, of any substantial reduction in relative operating costs under conditions as they now exist. Every effort has been made by the management to secure the greatest economy and efficiency of operation possible. To a very considerable extent the road is operated subject to the supervision of the Public Service Commission, and so far as that body has deemed it consistent with the rendering of proper service, it has co-operated with the management for the reduction of expenses, in some cases even making suggestions to that end. In the Bay State rate case, the Public Service Commission held that the company "must satisfy the commission that the needed income cannot be secured through more effi-

#### COOLIDGE CORNER TO PARK ST.

TIME MAN MUST BOARD CAR TO REACH DESTINATION AT 8 AM.



BOSTON ELEVATED—EXAMPLE OF CLOCK DIAGRAMS USED IN BRIEF TO SHOW TIME SAVED ON PRESENT SYSTEM AS COMPARED WITH SURFACE LINES IN 1888

cient management and operation." Along this line the Boston Elevated Railway in its brief describes the many efforts it has made to secure improved methods and increased efficiency, explaining each point in detail and often with supporting exhibits. One of these exhibits, in the matter of time saving, is reproduced in part herewith. The lines along which the company has secured increased efficiency, as noted before from time to time in the *ELECTRIC RAILWAY JOURNAL*, concern the following: Traffic, car operation and construction, power, tracks and roadbed, yards, electric switches and signals, revenue collection, handling sand, freight and safety work.

In regard to the higher cost of materials, the brief states that it is difficult to give specific unit cost prices for 1916 compared with prices for periods ten to twenty years ago, owing to the fact that substantially all material used by a street railway is in more or less manufactured form and the material used to-day is of a higher grade of manufacture than that used some years ago. The difficulty lies in trying to segregate the increase in price into that part which is due to the actual increase in the raw material and that part which is due to the higher quality of manufactured article.

Evidence of this is noticeable, for instance, in track special work. Crossings, branch-offs, switches, etc., used by street railways ten years ago would not to-day withstand the wear and tear to which present equipment subjects roadbed and track. But if the same construction were used to-day the increase in cost would approximate 30 per cent, whereas the actual cost when



improvements are included averages an increase of 60 per cent. This difficulty is further evidenced by the fact that ties, for instance, ten years ago were in practically no cases treated, while the ties used to-day are subjected to a treatment resulting in a material extension in their life. The company is paying in 1916 62.2 cents for the same grade of ties that cost 50.6 cents in 1905, an increase of 11.6 cents, or approximately 23 per cent advance, whereas the actual cost on account of using treated ties for 1916 is 68 per cent higher than in 1905.

All material used in the repair of equipment shows an increase in cost of the particular items necessary for such work, but in substantially every instance the design and quality of the manufactured article is likewise improved and the same difficulty exists in trying to divide that portion which is chargeable to basic material cost and that portion which is properly chargeable to increase due to improved manufacture. In connection with the increase in price of manufactured articles there enters not only the increase in price of raw material and the increase due to the higher grade

of accidents and injuries it has been impossible to effect any substantial reduction, owing principally to adverse legislation, court decisions interpreting the law more favorably to claimants, the greater liberality of juries, and the rise and growth of the ambulance chaser. As for paving, if the present program, particularly in Boston, is carried out, the company will be put to a very considerable expense, the estimated aggregate to the end of 1917 being \$566,392, as compared with \$61,153 in 1916 and \$51,925 in 1915. There is no doubt, therefore, that the operating expenses will be relatively larger for the year ending June 30, 1917, than they were for the year ended June 30, 1916, and added to this is the possibility of having to make some additional provision for depreciation. If, as was tentatively suggested in the Middlesex & Boston case, a street railway should be required to charge as an operating expense 20 per cent of its gross operating revenue to cover maintenance and depreciation, the Boston Elevated's operating cost for the year ended June 30, 1915, would have been increased \$926,804, and for the year ended June 30, 1916, \$679,050.

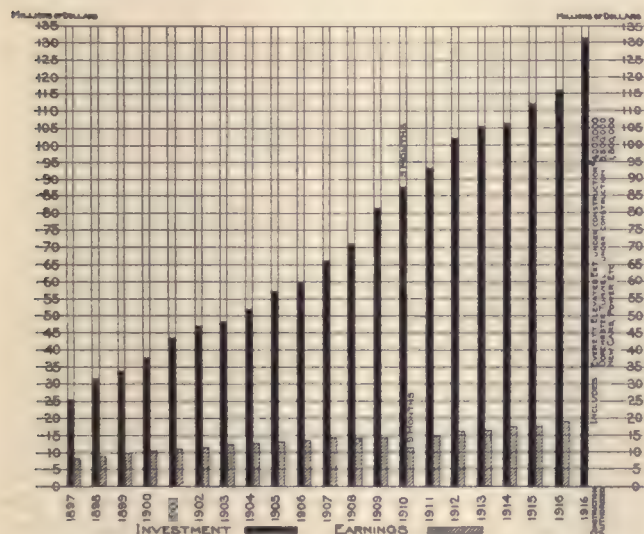
## 2. Increase in Permanent Investment:

The company's brief reviews at length the growth of its permanent investment, including detailed exhibits of outlays for the various subway, tunnel, elevated and surface lines. The management of the road has for several years foreseen the danger arising from the abnormal increase in the permanent investment and has repeatedly called the attention of the Legislature and of public commissions to the subject. As before stated, the permanent investment of the system on June 30, 1916, was \$116,022,060, while the comparative investment on Sept. 30, 1897, when the Boston Elevated assumed the operation of the system, was \$25,291,913. It is now four and one-half times as large as it was in 1897. During the same period the population of the territory served has increased from approximately 830,000 to 1,244,000, or only 50 per cent, while the number of revenue passengers has increased from approximately 172,000,000 to 363,000,000, or only 110 per cent.

In 1897 the permanent investment amounted to \$2.901 for \$1 of gross income, and \$2.963 for \$1 of passenger revenue. In 1916 it amounted to \$6.178 for \$1 of gross income, and \$6.393 for \$1 of passenger revenue. In 1897 the permanent investment was approximately 85 cents per revenue car-mile, while in 1916 it had increased to approximately \$2 per revenue car-mile. In 1897 the return upon the investment required 5.680 cents per revenue car-mile out of a total revenue of 28.498 cents per car-mile. In 1916 the return upon the investment, including subway and other rentals, interest on the elevated indebtedness and dividends at the rate of 6 per cent on its stock, called for 10.028 cents per revenue car-mile out of a total revenue per car-mile of 30.985 cents. In 1897, 0.986 cent out of every nickel was required for a return on the investment. In 1916, 1.5 cents out of every nickel of revenue was required for the same purpose. The accompanying reproduction of one of the company's exhibits shows graphically how the investment has increased more rapidly than the business warranted.

## 3. Increase in Service Rendered:

While the operating expenses per car-mile, the brief notes, were substantially the same in 1916 as they were in 1897, being 20.744 cents in 1897 and 20.624 in 1916, and while the amount required to pay a return on the investment, including 6 per cent on the elevated



BOSTON ELEVATED—CHART OF INVESTMENT AND EARNINGS

of manufactured article, but also the increased cost of labor used in the manufacture of such articles.

The brief concludes, however, that if it were possible to secure identically the same material as was used ten years ago, it would be found the unit price for same had increased very materially. Moreover, while it is impossible to prophesy what prices for materials will prevail for the next one, two or more years, there is no indication at the present time of any reduction in the cost of materials used in street railway operation for the next few years as compared with the costs for the last twelve months, and there is every reason to believe that the prices prevailing to-day will at least continue for the ensuing year.

In regard to higher labor costs, the brief notes the recent three-year arbitration award, covering the period from May 1, 1916, to May 1, 1919, which means higher wages for labor. It is estimated that the increase in rates of wages and changes in other conditions will result in an increased labor cost for the same service over the year ended May 1, 1916, for the year ending May 1, 1917, of \$400,000; for the year ending May 1, 1918, of \$600,000, and for the year ending May 1, 1919, of \$800,000.

Other operating items mentioned by the brief are accident, paving and depreciation charges. In the cost



stock, had increased from 5.680 cents per car-mile in 1897 to 10.028 cents in 1916, the revenue per car-mile increased only from 28.498 cents to 30.985 cents. During this period the average seating capacity of the cars had increased from thirty-two to forty-five, or an increase of more than 40 per cent in the average capacity of the cars. The latest surface cars now in use have sixty-two seats and some of the rapid transit cars seventy-two. It would naturally be supposed, the company remarks, that with an average increase of about 40 per cent in the size of the cars the revenue per car-mile would increase in proportion, assuming that no more cars were operated than was necessary to care for the traffic properly. That this has not been so is due to the practically universal free transfer system and the large increase in the population of the suburbs lying at extreme distances from the center of the city. The accompanying reproduction of an exhibit shows the growth of the transfer system.

The increase in the length of ride is indicated by the increase in facilities which are now required to accommodate the traffic at certain suburban points as compared with the facilities required at the same points in 1897, as shown by the following table:

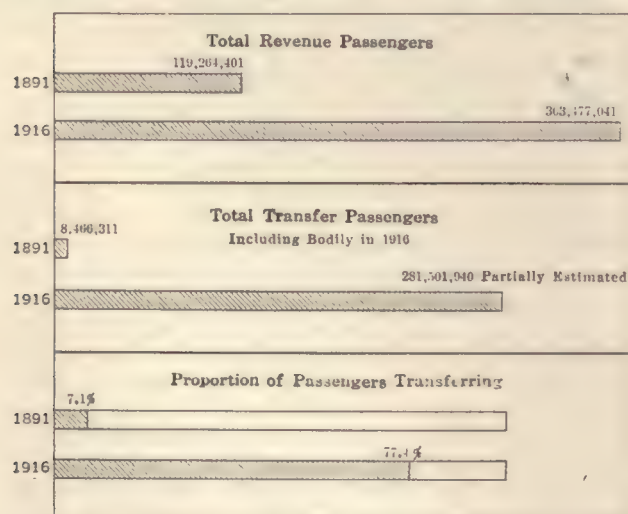
AVERAGE CAR SEATS FURNISHED PER DAY, TWENTY-FOUR HOURS

	Route Distance from Park		Per Cent	
Section	St., Miles (All Surface)	Seats, 1897	Seats, 1916	Increase Over 1897
Mattapan Square	6.706	.....	34,464	...
Neponset	6.807	10,052	18,336	87.4
Milton	7.621	16,072	35,176	118.9
Watertown Square	7.320	6,042	65,492	984
Newton (Nonantum Square)	7.063	10,268	41,956	309
Arlington Heights	5.533	7,636	37,680	393
Malden Square	5.585	20,756	67,012	223
Medford Square	5.724	6,518	57,356	780

This increase in the amount of long distance riding has prevented the increase in revenue per car-mile which would naturally have resulted from the increase in the size of the cars. The accompanying illustration shows graphically the increase in the number of seats furnished.

#### ADDITIONAL NET NOT OBTAINABLE THROUGH REDUCED EXPENSES OR INCREASED BUSINESS

After thus stating the causes of the present financial situation, the brief avers that the additional net

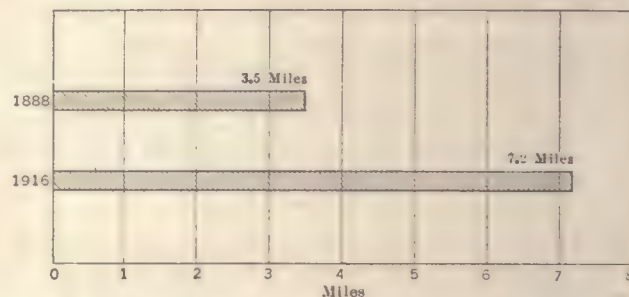


BOSTON ELEVATED—GROWTH OF FREE TRANSFER SERVICE IN TWENTY-FIVE YEARS

revenue now required cannot be obtained through either a reduction in operating expenses or an increase in business. As before stated, the company believes that the operating expenses will be relatively higher during the current year than they were during the year ended

June 30, 1916. Moreover, although the company has every reason to expect a substantial increase in business during the current year, it is absolutely impossible to forecast the exact amount of the increase. The increase in revenue passengers for the year ended June 30, 1916, was 17,160,457, or in gross earnings \$894,779. This was the largest increase in any one year since the company began business.

On the assumption of an equal increase for the current year, there must be deducted the additional cost of doing the additional business. The cost of power and conducting transportation for the year ended June 30, 1916, was \$7,161,355. This increases with the amount of mileage run and, on the assumption that it



BOSTON ELEVATED—SEAT-MILES PER REVENUE PASSENGER OR DISTANCE ONE SEAT IS RUN FOR EACH 5-CENT PASSENGER CARRIED

will require an increase of 5 per cent in the mileage to provide for the 5 per cent increase in the number of revenue passengers, the cost of power and conducting transportation for the current year will be increased by \$358,000. Deducting this from the increase in gross amounting to \$894,779 leaves \$536,779 net to take care of additional expenses and charges amounting to at least \$1,000,000.

This estimate allows only 40 per cent as the operating cost of doing the new business, and it is undoubtedly low. Among other things it takes no account of the increased rate of wages during the current year or any increase in maintenance charges due to increased mileage. In the company's opinion estimates for the ensuing years are still more uncertain, but it is evident beyond question that the increase in business cannot be relied upon to provide the additional net revenue which is needed.

#### HOW TO IMPROVE THE SITUATION

With assistance thus not possible through reduced expenses or increased business, the company in its brief suggests for the consideration of the commission the following methods of improving its financial situation:

1. An increase in the rate of fare.
2. The adoption of the so-called zone system of fares.
3. Charging for transfers.
4. Establishment of inclosed areas at transfer points where practicable so as to reduce the number of paper transfers.
5. Elimination of the 8-cent check between the company and the Bay State Street Railway.
6. Purchase of the Cambridge subway by the State and its rental to the company.
7. Temporarily charging off depreciation against premiums paid in on stock and bonds.
8. Return of the \$500,000 deposited with the State so that it will be available for ordinary capital purposes.
9. Reimbursement for subway rentals.

The adoption of some of these suggestions, to the company's mind, would have but a relatively small effect on its net revenue, but they would all contribute in



different degrees to the desired result, as shown below. Some of the suggestions contemplate that the entire cost of the transportation shall be borne by the car riders, while others contemplate that the communities in which the company operates shall make some contribution toward that cost. Heretofore the car riders who traveled upon the elevated system have not only paid the entire cost of transportation as such, so far as it has been paid, but have also through special taxes levied on the corporation contributed to the general expenses of the cities and towns in which the company operates and have likewise through the company made large contributions to the cost of maintaining the highways, which contributions have had no reference to any actual wear and tear caused by the operation of the company's cars.

The brief states, however, that an adequate system of street railway transportation is vital to the prosperity and growth of the community as a whole, apart from the car riders. It increases the value of real estate and the rents to be derived from it, it increases the business of the merchants, and it adds to the revenue of each city and town by increasing the value of the taxable property. The necessity of a contribution by the community toward the cost of improved transportation if existing fares are to be retained has been recognized in connection with new rapid transit construction in New York and Philadelphia, and the brief recites the main points of the arrangements in these cities.

#### 1. Increase in the Rate of Fare:

The present fare on the elevated system is 5 cents, and by means of free transfers a passenger can in general ride from any part of the system to any other part for 5 cents. At the time this fare was established, in view of the fact that the length of ride was limited and that an additional fare was charged for transfers to different points and also for exceptionally long rides, the revenue was sufficient to pay the cost of transportation, including a return upon the capital investment. Conditions have changed, the company says, and, owing to the cost of the rapid transit lines, the extensions of the service and the increase in the cost of labor and materials a 5-cent fare with universal free transfers is not now sufficient.

The company is, however, by contract with the State limited to a 5-cent fare until June 10, 1922. This contract is contained in Section 10, Chapter 500, Acts of 1897. It makes no provision for increasing the fare if it should subsequently prove to be insufficient, but it safeguards the public in case the rate of fare should subsequently prove to be higher than necessary: (1) By requiring the company to pay to the State a sum equal to any amount paid out in dividends in excess of 6 per cent, and (2) by providing for a reduction in the rate of fare if the company should be able to earn more than 8 per cent upon its stock. Furthermore, the State retained the right, within certain limits, to control the character and extent of the service, upon which in large part depends the cost. The present insufficiency of the 5-cent fare, while due in part to the increase in the cost of labor and materials, is principally due to the fact that the company has felt compelled through the pressure of the Legislature and public opinion to extend its service more rapidly than any one anticipated in 1897, and more rapidly than the growth of the business warranted. Under these conditions, it is in the opinion of the company not unfair to expect the State to consent to a change in the contract, especially in view of the fact that the change is made necessary largely by the character of the service which the public has required, and that the company without some relief will

be unable to meet further transportation requirements.

It is impossible to tell in advance what effect an increase of fare from 5 to 6 cents would have upon the income of the company. It would depend upon the extent to which the riding might be affected, and also upon whether or not tickets were sold at reduced rates. Experience has shown that an increase in the rate of fare not only temporarily, but permanently, reduces the amount of riding, so that the full benefit of the increased rate is not obtained. If this is coupled with the sale of tickets at a reduced rate, the increase in gross income is still less. The brief states that the instances of an increase of fares for urban transportation have been so few as to furnish no satisfactory basis for an estimate as to the effect on traffic.

As far as the collection of a 6-cent cash fare is concerned, the present system of prepayment and mechanical fare boxes could be easily adapted to it. If tickets should be issued, it would involve a very material change in the whole system of fare collection. The brief concludes this point with the statement that if the persons who use the cars are to pay the entire cost of transportation, an increase in the unit of fare is probably the only practicable method of providing the necessary increase in revenue, and in view of the fact that the territory served by the company has been built up on the basis of a uniform fare, is less objectionable than the so-called zone system.

#### 2. Zone System:

In order to increase the income of the company by means of a zone system, it would be necessary that the zones be established at such points and such additional fares established for riding through the zones as to produce an average fare in excess of 5 cents. The principal argument in favor of the zone system is that the rate of fare so far as practicable is based upon the length of ride and is proportionate to the service rendered. It is generally considered that when passengers are carried more than  $4\frac{1}{4}$  miles for a 5-cent fare it is done at a loss. This loss must be made up by the income received from passengers riding a shorter distance, who are therefore paying more than full compensation for the service they receive.

The elevated lines extend out from the city to points far beyond the limit to which passengers can be carried for 5 cents without loss, some of the distances ranging from 6.08 miles to 9.18 miles. Transfer provisions may increase the 5-cent fare distance. For example, the brief notes that a passenger may not only ride from Arlington to the center of Boston, a distance of 8.66 miles, for 5 cents, but if he desires he may transfer and continue his ride as far as Mattapan or the Charles River, covering in this way a distance of 18 miles or more for 5 cents. Even longer rides than this are possible under present transfer arrangements.

In the company's opinion, such long rides are a burden on the remainder of the system, but there are arguments against the adoption of a zone system of fares, as follows:

(a) The territory served has been developed, values have been fixed and homes established on the basis of a uniform fare, and it would be unjust at this late day to discriminate against portions of the territory by a difference in the rates of fare,

(b) The zone system, it is claimed, tends to concentrate the population within the interior zone, particularly in the case of people to whom the additional fare is of consequence, and to prevent their making their homes in the suburbs where the conditions are more healthful. On the other hand it is claimed that the zone system does not have that effect and the only difference is that in the case of a uniform fare the price of



real estate in the suburban district advances much more rapidly than in the case of the zone system.

(c) In the case of the city of Boston, where the traffic is heavy at rush hours, the collection of additional fares at zone points would not only entail considerable additional expense but would be likely to delay and inconvenience the passengers somewhat.

If a zone system were to be established in Boston, however, the rapid transit lines would be a controlling factor. The interior zone would have to include the terminals of the rapid transit lines, for the reason that the expense and inconvenience of attempting to collect additional fares on the rapid transit trains would render it impracticable. The Forest Hills station on the elevated lines is about  $4\frac{3}{4}$  miles from the center of the city, and this is the extreme limit to which a passenger can be carried for a 5-cent fare without loss. With this fixing the limit of the interior or 5-cent zone, a line could be drawn approximately the same distance from the center which, commencing at Fields Corner in Dorchester, would pass through Forest Hills, corner of Market and Washington Streets, Brighton, Mount Auburn, North Cambridge, Teele Square in Somerville, Medford Square in Medford and Malden Square in Malden. If a 5-cent fare was established for all rides either within or without this zone, and an additional fare of 2 cents for each passenger crossing the zone boundary whether going to or from the center of the city, it would undoubtedly mean a substantial increase in income.

In the company's opinion, however, the extent to which the net income would be increased is a matter purely of estimate, depending upon the number of passengers who would pay the increased fare and the additional cost of collection. If 10 per cent of the total revenue passengers paid the additional 2 cents, it would mean an increase in gross income on the basis of last year's business of \$727,000. Against this must be offset the cost of collection. The company, through the installation of mechanical fare boxes, prepayment cars and inclosed areas, has endeavored so far as possible to economize in the collection of fares and to minimize losses. The present method of collecting fares could not be used for the collection of zone fares. Some different method would have to be adopted, and it would probably mean the employment of special fare collectors at times of heavy traffic. The additional expense of collecting these zone fares has been estimated at from \$150,000 to \$200,000 a year.

The brief concludes that whether a zone system of fares is adopted or not, the commission should lay down the fundamental principle that as long as a uniform fare exists, no further extensions of the system into territory not now served should be permitted unless it is within a distance to which passengers can be carried without loss.

### 3. *Payment for Transfers:*

As there were approximately 281,000,000 free transfer passengers for the year ended June 30, 1916, a charge of 1 cent for each transfer would on the face of it substantially add to the company's income. The system is, however, different from any other in the United States. It is a combination of surface and rapid transit lines, and so arranged that passengers from most of the suburbs will make their journey partly on the surface lines and partly on the rapid transit lines.

Transfers of this character constitute the largest part of the free transfers, and if each one were to be charged 1 cent for his transfer the unit of fare might just as well be increased to 6 cents unless the passenger were given the alternative of riding to his destination

on the surface lines. The cost of maintaining a duplicate service would, however, offset any increase in income from those who chose to pay for transfers. A charge for transfers from one surface line to another might prove of advantage if the company could be guaranteed against having to provide additional through service, but the minute passengers were required to pay for their transfers the pressure upon the company to provide a through service for a single fare would be very great. The company believes that material advantage would be gained by reducing the number of transfer points and eliminating the use of paper transfers as far as possible.

### 4. *Inclosed Areas at Transfer Points:*

Free transfers are made either through the medium of inclosed areas or a paper transfer that is accepted in lieu of a cash fare. There are now 111 points on the system at which paper transfers are accepted, and during the year ended June 30, 1916, 109,843,228 free transfer checks were issued and 85,621,020 received by the company. The real solution of the transfer problem, discussed in detail in the brief, is to eliminate as far as possible the use of the paper transfers.

During the last three years the company has with the co-operation of the Public Service Commission put into effect several inclosed areas on its own property, and is also with the co-operation of the Boston Transit Commission establishing inclosed areas in connection with the new Dorchester Tunnel. Nevertheless, in order to enable the company to establish additional inclosed areas at some of the largest transfer points, additional legislation is necessary. In connection with surface lines and rapid transit lines not constructed by the Boston Transit Commission, the company should be authorized by the Legislature to take land by right of eminent domain as far as necessary for the establishment of inclosed areas, and should also be authorized to use public highways for that purpose as far as traffic is not unreasonably interfered with.

The Public Service Commission should also be authorized to grant necessary relocations of surface tracks wherever it is necessary for the purpose. While the local authorities have power to grant these relocations, yet they are confronted by strong local opposition on the part of storekeepers who benefit by the stop-over privileges which passengers avail themselves of at certain transfer points. The system, however, is essentially at the present time a metropolitan system, and the right to grant necessary locations for inclosed areas should rest with the Public Service Commission, which represents the territory as a whole.

### 5. *Eight-Cent Checks:*

During the fiscal year ended June 30, 1916, the company collected 1,827,762 of the 8-cent checks issued by the Bay State Street Railway, and the Bay State company collected 655,137 of the checks issued by the Boston Elevated Railway. The only explanation for the difference is that people living on the Bay State line in places where the Boston Elevated runs in adjacent territory purchase checks in the morning when riding on the Bay State cars and use the other portion when returning on the Boston Elevated cars in the afternoon. In parts of Chelsea this could readily be done, and, if it is done, each ride would cost but 4 cents in place of 5 cents.

This is the only instance where a passenger can ride over the entire elevated system for 4 cents, and the checks were never intended to permit such a practice. While the company believes it has the right to discontinue the issue and acceptance of these checks, its right so to do has been questioned, and suitable legislation



authorizing it should be enacted. If the exchange checks were entirely discontinued and the same number of passengers continued to ride, the result would be that both the companies would benefit to the extent of 1 cent each on 2,472,899 passengers, amounting to \$24,728, all of which would be net earnings.

6. *Purchase of Cambridge Subway by the State or a Metropolitan District:*

The purchase of the Cambridge subway by the State or a metropolitan district would provide the company with approximately \$9,100,000 of new capital at a cost of 4½ per cent annually, which is much less than it will cost the company to obtain the money by the issue of its own stock and bonds. Whether the company can obtain any new capital, the brief states, and if so, at what cost, depends very largely upon the action of the special commission now sitting and the subsequent action of the Legislature.

7. *Charging Off Depreciation Against the Premiums Paid In On Capital Stock:*

If the Public Service Commission should feel that any provision must now be made for past depreciation, then, instead of restricting the issue of new capital or requiring this depreciation to be cared for in any one year, it should be authorized by the Legislature to allow the depreciation to be charged against the premiums paid in by the stockholders. This money, however, represents the investment of the stockholders just as much as that portion paid in up to the par of the stock, and it would be unfair to apply it permanently to depreciation. The company's suggestion, it is said, is intended merely as a temporary expedient to help the immediate situation and the fund, so far as it is used for that purpose, should be restored by charging a proportionate amount into operating expenses over a period of, say, ten years.

8. *Return of \$500,000 Deposit With State:*

The repayment of this deposit to the company would give it that much additional capital which would be immediately available to pay the cost of additions and improvements. Necessary legislation should be passed authorizing the repayment of this sum.

9. *Reimbursement for Subway Rentals:*

With the exception of an increase in the rate of fare, none of the suggestions heretofore submitted will provide the company with a fair return upon its investment or with sufficient net revenue to obtain new capital in order to meet its immediate requirements. While they would all have a tendency in time to increase the income or reduce the expenses, the effect would not be immediate. The only adequate alternative for an increase in fare which the company is able to submit is the assumption by the communities benefited, of a portion of the present subway and tunnel rentals. The revenue car-miles run in the subways and tunnels for the year were 5,138,284, and the rentals of \$844,184 alone imposed a charge of approximately 16.5 cents per car-mile without taking anything into account for a return upon the equipment. The return upon the entire permanent investment of the Boston Elevated for the year ended June 30, 1916, counting dividends at 6 per cent, called for 10.028 cents per car-mile.

The leases of the subways and tunnels from the city run until July 1, 1936, and thereafter are subject to termination by either party. The rate of rental cannot be changed without the consent of both the city and the company, and even with their consent probably cannot be changed without the consent of the holders of the

bonds issued by the city to pay for the subways, which latter consent it would probably be impracticable to obtain. In the company's opinion, however, there is no legal reason why the State should not be authorized to retain the franchise and compensation taxes and apply them to the reimbursement of the company for subway and tunnel rentals as far as necessary to enable it to pay 6 per cent dividends on its stock. The balance would be distributed among the cities and towns on the same basis as at present. The franchise and compensation taxes, amounting together to \$583,700 for 1915, are not retained by the State, but are paid over to the different cities and towns in which the company's tracks are located in proportion to the mileage operated in each of them.

On the basis of the company's operations in 1915, the above plan would have called for a reimbursement to the company of approximately \$119,397, or a reduction in the amounts to be distributed among the cities and towns of about 20 per cent. The taxes for 1916 have not yet been ascertained, but with the franchise tax and corporation tax for 1916 the same as in 1915, this arrangement would call for a repayment of approximately \$238,794, or a reduction in the amount to be distributed among the cities and towns of approximately 40 per cent.

This suggestion is offered as one of the alternatives for an immediate increase in fare. None of the other suggestions in themselves, the company believes, would produce enough additional net revenue, and unless some plan of this kind is adopted the company knows of no practicable method of obtaining the necessary additional net revenue except by an increase in fares. It has the great advantage of being flexible, as the amount for which the company is to be reimbursed each year depends upon the result of its actual operations, which cannot be forecast in advance. This suggestion also equalizes to some extent the burden of the rapid transit subways and tunnels by placing it proportionately upon all the cities and towns which are to be benefited instead of leaving it to be borne by the city of Boston alone. This plan would have the further advantage of making the public directly interested in the question of whether or not further burdens should be imposed upon the company.

GENERAL CONCLUSION

While general market conditions undoubtedly have had much to do with the increased cost of obtaining money for street railway purposes, the uncertainty as to street railway investments and in the case of the Boston Elevated Railway the uncertainty as to its future financial condition and its ability to maintain its 6 per cent dividend have increased the cost of obtaining new money. It is in the interest of the public that this should be obtained at the lowest possible rate, and in so far as this is affected by the uncertainty as to the maintenance of 6 per cent dividend this uncertainty should be removed.

Whatever else may be done, it is vital that the rate of fare should be increased whenever the company is unable to earn 6 per cent on its stock after making such allowance for depreciation and other reserves as the Public Service Commission may approve or require, and adequate provision should be made for this by legislation.

Whatever action is recommended by the special investigating commission, it should, in the company's opinion, include some arrangement for a period of years, say until the expiration of the present subway leases, by which the company may be assured of 6 per cent dividends as long as it is properly managed and properly performs its functions as a public agent.



## New England Street Railway Club Outing

A Visit to Connecticut Valley and Many Forms of  
Entertainment Were Features of This Most  
Enjoyable Event

**T**WO hundred and thirty-five members and friends of the New England Street Railway Club assembled at Springfield, Mass., Sept. 21, for the annual fall outing of the organization, which was one of the most enjoyable in the club's history. The program included features of transportation interest in addition to almost continuous entertainment, and registrations covered practically all sections of New England.

Upon arrival at Springfield the members were welcomed by President C. V. Wood of the Springfield Street Railway, who is also president of the club, and his associates in the local company. A buffet luncheon followed at the rooms of the Springfield Board of Trade, which was also attended by prominent business and professional men, who greeted the club most cordially. The outing program consisted of a cleverly designed transfer check on which the various events were scheduled, with time punch marks indicating the hour of departure of the special cars provided for the club at every point in the itinerary, and containing humorous admonitions in the form of conditions of use, the transfers being valid only to members casting off the cares of their daily work and entering properly into the spirit of the occasion. In one corner of the transfer there was a series of sketches somewhat similar to those at one time used on a real transfer to identify passengers, but those on the outing transfer consisted of humorous sketches appropriate to the occasion.

At the close of the luncheon the club assembled at the celebrated "municipal group" of buildings on Court Square, where a photograph was taken. Following this, six special cars were taken to the grounds of the Eastern States Industrial Exposition in West Springfield, where the members inspected an arena with a capacity of 7000 persons, a prepayment area and loop track facilities for handling the large traffic anticipated at the grounds next month. The new buildings were also visited, and cars were then taken to Riverside Park, where a clambake and green-corn feast of maximum dimensions was followed by an entertainment, the crowning feature of which was a superb display of fireworks, including a set piece showing a realistic likeness of President Wood; also a luminous trolley car, which crossed the lawn in the midst of great applause. The party then returned to Springfield, and the day closed with a cabaret show at one of the hotels.

On Friday morning an early start was made for the Hooker Street car shops of the Springfield company, now under construction. The extensive facilities in prospect here were scrutinized with interest. For the convenience of the visitors, the Springfield Street Railway Company distributed to the members of the club at this point a leaflet which gave the plans, elevations, section and other drawings of the North Main Street carhouse.

Upon arrival at Holyoke, President L. D. Pellissier of the Holyoke Street Railway welcomed the members to the city, and escorted them through the lately completed shops of his company.

The next objective of the club was the summit of Mount Tom, which was reached by electric car. Here the members enjoyed a good dinner and a fine view, the propitious weather adding greatly to the pleasure of the trip. The party returned to Springfield by special cars in the afternoon, and disbanded for home.



Members of the New England Street Railway Club on the Occasion of Their Outing to Springfield and Holyoke Last Week  
View Taken in Front of Municipal Group in Springfield on Sept. 21



# The Individual Contract in Indianapolis

The Recent Use of Individual Contracts in New York Makes This Account of Their Adoption in Indianapolis Two Years Ago of Especial Interest

**D**URING the recent strike agitation in New York much discussion centered around the individual working agreements that had been signed or were being signed by employees of the Interborough Rapid Transit Company and the New York Railways. Numerous statements appeared in the daily press to the effect that similar service contracts had been used before for electric railway employees in Indianapolis, Ind., and that legal opinions rendered in regard to such contracts might serve as precedents in the New York case. Explanations of this so-called Indianapolis precedent, however, have been either vague or inconsistent, and the editors of this paper have deemed it wise now to review, from the complete record previously published in these columns, the main features of the Indianapolis case, in order that its exact effect upon the New York situation may be judged. The review should be of value in this respect, for as far as is known the contracts in Indianapolis, which are far more detailed than the New York agreements, form with the latter the only individual working agreements in the electric railway field.

## HOW THE INDIANAPOLIS CASE AROSE

The individual contracts between electric railway employees in and around Indianapolis and their companies came into existence as a result of the labor troubles stirred up in 1913 by the Amalgamated Association of Street and Electric Railway Employees of America. This association made a determined effort to organize electric railway employees in the Indianapolis section, but after a campaign of several months only a few employees had joined the union.

In August, 1913, short strikes on some of the interurban lines radiating from Indianapolis proved complete failures, but at the beginning of November a strike was called on the city lines of the Indianapolis Traction & Terminal Company. Violence followed, and the governor was compelled to call out the militia. On Nov. 7, 1913, to settle the strike, the governor and the Indiana Public Service Commission, in conference with the company, prepared an agreement which was ratified by the employees and ended the strike. This provided in general that any grievances as to wages, hours and other working conditions not settled between the employees and the company should be decided by the Public Service Commission and be binding for three years and that all adjustments and arbitration should proceed only in the name of a committee of employees, the intent being that the company would not treat with or recognize any union but would not discriminate between union and non-union men in its employ.

This settlement had no sooner been made than another attempt was made to call a strike of the men of the various interurban companies operating into Indianapolis. The men, however, refused to leave their cars and expressed to the companies their desire to be left alone by outside agitators. To define the situation more clearly it was suggested that agreements be drawn up which would in the future provide for arbitration by the Public Service Commission of matters not adjusted between the interurban lines and their employees, and such agreements were individually executed by employees of the Indianapolis & Cincinnati Traction Company and the Terre Haute, Indianapolis & Eastern

Traction Company. Although, in a strict sense, these were the first individual contracts used in Indianapolis, they will be passed over here in order not to confuse the reader and attention will be turned to the more generally instructive case of the contracts later devised for employees of the Indianapolis Traction & Terminal Company.

The Indiana Public Service Commission, sitting as the board of arbitration as provided in the Indianapolis Traction & Terminal Company settlement of Nov. 7, began its hearings on Dec. 4. In its decision, rendered on Feb. 11, 1914, the commission ordered a wage increase and certain changes in working conditions, arranged for the future arbitration of disputes and held that the company was not required to recognize the union. It ruled that the company should not be obliged to employ only union men and that no men then or thereafter in its employ should be required to become a member of any labor organization, but that the company should not discharge a man solely for the reason that he was a union member. It was also provided that no discrimination by employees for or against union or non-union men would be permitted.

## IMPRACTICABLE FEATURES OF AWARD LED TO INDIVIDUAL CONTRACTS

The above-mentioned award of February, 1914, contained certain conditions which were found to be impracticable in the electric railway business. These conditions had mostly to do with the provisions that each motorman and conductor should be permitted and required to be off one Sunday in each month; that he should be permitted and required to have eight consecutive hours' rest between runs, and that extra men should receive a minimum wage of \$45 per month. Under these regulations the company found it impossible to take care of the extra baseball, park and theatre traffic on Sundays and holidays.

The Amalgamated Association, having failed up to this time to force recognition of the union, undertook to take advantage of these defects in the award and compel the company to recognize the union as the price for a new agreement which would make the award workable. The railway refused to consent to any recognition of the union, and formulated an individual contract to be submitted to the employees.

This individual agreement, dated April 22, 1914, was in substantially the same form as the February arbitration award, but it contained clauses permitting car-service men who signed it to work Sundays if they so desired and provided eight hours' rest in each twenty-four hours but not necessarily eight consecutive hours between runs if the public service should at times prevent this. This individual contract was readily accepted by a majority of the employees. All the non-union men signed it, and many of the union men, about 90 per cent of all employees thus becoming parties to the modified agreement. The full text of the individual contract for employees of the Indianapolis Traction & Terminal Company appears on page 780.

## ARBITRATION BOARD UPHOLDS CONTRACT

The Amalgamated Association, evidently wanting to have the sole right to enter into contracts on behalf of



employees, immediately attacked the individual agreements, and endeavored to prove to three members of the Indiana Public Service Commission, acting as the board of arbitration under the February settlement, that such contracts conflicted with the February award in the matter of working conditions and were invalid. In the early autumn of 1914, however, this arbitration board held that the individual contract was valid in all provisions in which it did not conflict with the February award, and that if the company succeeded in getting the signatures of all employees the service contract would then be effective in all particulars. In other words, the only point where the individual agreement could not be construed as in accord with the February

award concerned the aforementioned "impracticable" working conditions. In this regard the arbitration board held that the original eight-hour provision should remain unabridged, but that extra men could be hired for service on Sundays and holidays at the regular rate and not at the \$45 monthly minimum wage. Thus the regular employees were disqualified from taking their regular Sunday runs on one Sunday each month and also whenever eight hours did not intervene between the end of the Sunday run and the beginning of the Monday run, but the arbitrators' decision left the men the opportunity to do the Sunday work as a result of all the employees executing the individual contracts.

Not satisfied with the arbitration finding, the Amal-

## INDIANAPOLIS TRACTION & TERMINAL COMPANY WORKING AGREEMENT

INDIANAPOLIS, IND., APRIL 22, 1914

**THIS AGREEMENT, by and between the Indianapolis Traction & Terminal Company and its car service men, witnesseth:**

**First:** The rate of pay until Nov. 7, 1916, for men employed regularly as motormen and conductors shall be as follows: In continuous service—One year or less, 21 cents per hour; one year and less than two years, 23 cents per hour; two years and less than three years, 24 cents per hour; three years and less than four years, 25 cents per hour; four years and less than five years, 26 cents per hour; five years or more, 27 cents per hour.

Forty-five dollars minimum monthly wage, provided that from any sum added to actual earnings to make such monthly minimum wage, the company shall deduct the value of any runs such employee missed by reason of his own fault.

The foregoing rates of wage shall not apply, however, to men employed especially to serve on special occasions as motormen and conductors when it is necessary to supplement the regular force.

**Second:** Each employee signing this contract agrees to in all things abide by the rules and orders of said company as the same are now or may from time to time be established. The business of said company shall at all times be conducted on the open shop principle. No scheduled run shall exceed twelve consecutive hours of continuous service, and schedules allowing at least eight hours' rest in each twenty-four hours shall be provided; but these rules shall be flexibly adapted to the actual needs of the public service; in all cases causing as little hardship as possible, to enable the company to accommodate park, theater, baseball and other special travel requirements, and at the same time not deprive the employee of the privilege of taking his regular run on any day.

**Third:** If at any time said car service men, or any of them, have any grievances of any kind or character as to wages or conditions of labor, such grievances shall be presented to and taken up with the company on the second or fourth Tuesday of each month, at the office of the superintendent. And such employee or employees may appear in person or be represented by any other employee or employees in the same class of service. Said superintendent will give a fair hearing, and from his decision an appeal may be taken on the third Tuesday of the month to the president of the company, who shall hear such appeal and correct any erroneous decision of the superintendent. And within ten days thereafter any such grievance not satisfactorily disposed of in the foregoing manner, shall be referred to the Public Service Commission of the State of Indiana for final decision. Said commission shall and is hereby agreed to be a permanent board of arbitration of all questions which may be referred to it under the provisions and in harmony with the terms of this contract. The authority and jurisdiction of said commission to revise, reverse or modify any decision rendered by it on any matter so referred shall be continuous. The evidence may be submitted by affidavit or orally upon oath. It is agreed that all such decisions of said commission shall be binding and conclusive unless so modified, revised or rescinded by said commission. And the parties hereby mutually agree to at all times conform to and obey any and all such decisions, and that this contract shall in all things be liberally construed so as to provide an effectual and constantly available remedy to adjudicate all controversies which may at any time arise.

**Fourth:** In any decision of the said Public Service Commission, said commission may decide when and under what conditions the said decision shall take effect, and to whom it shall apply, and fix any conditions it may deem proper, and either party may at any time file and have heard a motion for a modification or review of such decision. The decision of said commission on any point shall be in harmony with the express terms and provisions of this contract.

**Fifth:** Any discharged employee may appeal for reinstatement to the superintendent and from the superintendent to the president, and from the president to the Public Service Commission in the manner and at the times hereinbefore provided. Upon hearing of his appeal by the commission, if the commission finds that there is a reasonable and strong suspicion of his being guilty of conduct inconsistent with the proper discharge of his duties as an employee, he shall not be reinstated, but if the commission, on the other hand, shall

find that he was discharged wholly without cause, he shall be reinstated upon such terms and under such conditions as the commission shall order.

**Sixth:** The parties hereto enter into this contract for the purpose of assuring a continuous and uninterrupted public service to the citizens of Indianapolis. It is the intention of the parties hereto, by entering into this contract, to avoid any possible suspension of the operation of the cars of said Indianapolis Traction & Terminal Company, or of any other cars operated over its tracks, due to any labor controversy, and to that end and in consideration of the mutuality of the obligations hereinafter as well as hereinbefore contained, it is further agreed as follows:

By each and every employee becoming a party hereto, that he will not participate in any strike of the employees of said company, or interruption of the service to the public, and will not at any time or for any reason engage in any such strike, or counsel or advise any other employee so to do, or enter into any agreement of any kind or character with any person or persons, the purpose of which shall be to induce or procure the employees of said Indianapolis Traction & Terminal Company, or any of them, by concerted action, to quit the service of said company, in a body or at a given time, or in any way to interfere with the operation of any car or cars or other property of said company, or to prevent its employing persons to run said cars, or otherwise to hamper or obstruct the said company in the discharge of its duties to the public as a common carrier of passengers, but that he will submit to arbitration in the manner above described any grievances or controversy which may arise, or that desiring to leave the service of the company on account of any such grievance or controversy without such arbitration thereof, or for any other cause, he will only do so peaceably and as an individual, singly, and without confederation or agreement, as aforesaid, and at such a time and in such a manner that the public service will not be impaired.

And in consideration thereof, said company on its part agrees that it will not lock out its employees in a body or close down its works, or cease operation of its cars, or refuse to employ and keep in its employ a force of suitable and competent men who are willing to abide by the terms of this agreement, or discharge men wholly without cause or otherwise violate the agreements herein contained.

**Seventh:** Any presentation of grievances, or any arbitration as herein provided, shall proceed only in the name of and under the direct charge of the complaining employee or employees or committee thereof, who before said Public Service Commission shall be entitled to appear by a duly admitted attorney of the Indianapolis bar.

**Eighth:** This agreement shall be signed by the duly authorized officials of the said Indianapolis Traction & Terminal Company, and by each of said motormen and conductors of said Indianapolis Traction & Terminal Company agreeing thereto. It shall become operative as a contract between the company and each and every employee who executes a copy which the company has previously executed, from the date of its execution by such employee, and may be executed by any employee at the time he enters the service of the company or any time thereafter. Joint execution by employer is not required or essential to its validity.

**IN WITNESS WHEREOF** said company has hereto set its name by its duly elected and authorized president, and said employees agreeing hereto have each subscribed their respective names, with the dates of their respective signatures thereto.

INDIANAPOLIS TRACTION & TERMINAL COMPANY,

By .....

President.

APPROVED:

.....

Employees:

Name:

Date:

.....



gamated Association demanded that all the individual contracts be surrendered and, upon the refusal of the company to comply with this demand, began to make preparations for a strike. The avowed purpose of this was to force the company and the signers of the individual contracts to submit to the cancellation of these agreements.

At this stage in the proceeding, however, an action was brought in the United States Circuit Court by the Guaranty Trust & Safe Deposit Company, Philadelphia, Pa., as trustee of the mortgage securing the bonds of the Indianapolis Traction & Terminal Company, to restrain the strike agitation. This was based upon two grounds:

1. That, inasmuch as the arbitration award of February, 1914, had provided against a strike, the action of the Amalgamated Association officials and all persons having no contract relations with the company, in attempting to induce, persuade, force or intimidate the men who were working under the award to break that award, was a wrongful act, which could be enjoined.

2. That the action of all such persons and also those who were employees of the company but had not signed the individual agreements, in attempting to induce, persuade, intimidate or force those who had signed the individual agreements to break them, was a wrongful act, which could be enjoined.

#### COURT ISSUES STRIKE INJUNCTION

The result of this action was a temporary restraining order on Sept. 23 and later, on Nov. 7, an injunction restraining the leaders of the Amalgamated Association and local labor union leaders from confederating to bring about a street railway strike in Indianapolis and prohibiting the car-service men from striking. The federal court applied the well-established doctrine that a person who is not a party to a contract has no right to solicit or persuade or otherwise procure a party to that contract to make a breach of it.

The individual service contract of the company was found by the court to be valid, binding and in full force on its signers, and the men who had not signed the contracts could not in any way interfere with those who had signed them enjoying the privileges provided thereunder. The names of about 200 union men who were working under the February award and more than 500 others who were working under individual contracts were included in the court order, and each was enjoined from striking or attempting to bring about a strike. The outside and local labor leaders were also enjoined from inducing any of the employees named to violate either the February award or an individual contract by striking to compel the company to operate upon the closed-shop principle.

A strike injunction has really, therefore, been in force since September, 1914. From then to the present time no labor organizer has presumed to advise, persuade or in any way solicit the car-service men on the Indianapolis lines to violate their agreements with the company by going out on strike. The injunction case was appealed by the Amalgamated Association to the Federal Circuit Court of Appeals, in Chicago, and it was argued on Nov. 30, 1915, and reargued on May 23, 1916, but no decision has yet been rendered.

#### SUPPLEMENTARY WAGE AND BONUS AGREEMENTS

The wage scale prescribed by the individual contract first offered on April 22, 1914, was to remain in force until Nov. 7, 1916, when the original three-year settlement agreement with the Governor and the Public Service Commission would run out. Prior to this time, on July 6, 1916, the company, as a result of a long

discussion with representative employees, announced an increase in wages, as noted in the *ELECTRIC RAILWAY JOURNAL* of July 15. This increase was to be agreed to by the men as a supplementary clause of the individual working contract. The new wages were to become effective on Jan. 1, 1917, and to remain in force up to and including Dec. 31, 1921. Outside of the increase in wages provided for there was no change in the working conditions as stated in the individual contracts. All car-service men signing the individual working agreement and the new wage supplement, however, were to receive a bonus of 1 cent an hour for each hour worked up to and including Nov. 7, 1916, and a bonus of the difference between the old rate and the new rate from Nov. 8 to Dec. 31, 1916, inclusive. It was further provided that each employee, to be entitled to the bonus, must thereafter have truly opposed and used his influence to oppose any strike or attempt to strike, and, in the event of a strike, have faithfully reported for duty at his usual time and place each day and operated his car as his superior officer directed.

It was provided that for men signing the various agreements on or before July 8, 1916, the bonus would begin to accrue on July 1, and for those signing after July 1 and before Aug. 1 it would begin to accrue at the date of signing. In case of new employees entering the service before Jan. 1, 1917, the bonus would begin to accrue at the date of signing. Before July 8 most of the men had accepted the new terms.

### The Right to Strike

Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal., delivered an address before the Los Angeles Advertising Club on Sept. 4, on the subject of "Obligation." The address related largely to the Federal eight-hour railroad law, but Mr. Shoup also discussed the electric railway affairs and obligations of the worker. Among other things he said:

"No one disputes the right of a man to quit his job because of a personal dissatisfaction. The inference is, however, that he will not as a result become a burden on the public and that he has reasonable expectations of maintaining the independence he has exhibited in quitting work. No one blames a man for seeking better wages, but this seeking has proper foundation only in that he is able to give more to the world in productive labor, whether of hand or mind, than the value placed upon his labor heretofore. Men are sought for at higher wages because they are able to deliver the goods, but the situation is very different when men, through associated power, secure a larger return for their labor without any consideration as to what they may be giving for that labor.

"We must all understand why our individual returns for our work cannot be increased except at the expense of someone else unless we are able to give more to the world in the way of value than we have been giving. We must understand the meaning of the word 'obligation' and that it is not difficult, in failing to realize it, to wreck the whole industrial fabric of this country.

"How far we are from accepting the eight-hour day as having the practical sanction of society is shown by the election held upon an amendment to the constitution in California looking for the establishment of an eight-hour day; this was in November, 1914. The adverse majority was the greatest given against any measure ever submitted to the voters of this State; 560,000 voted against the measure and only 282,000 for it. In every county the first vote was adverse. In Oregon and Washington, where a similar measure was submitted, the results were the same."



## AMERICAN ASSOCIATION NEWS

### Entertainment Committee Greatly Augmented

President Charles L. Henry of the American Association has appointed the following to the entertainment committee in addition to the men whose names were listed on page 1189 of the June 24 issue.

H. H. Adams, superintendent shops and equipment, Chicago (Ill.) Surface Line.

Carl Beck, Westinghouse Traction Brake Company, St. Louis, Mo. M. R. Boylan, General Auditor, Public Service Railway, Newark, N. J.; L. C. Bradley, district manager, Stone & Webster, Texas district, Houston, Tex.; G. Sabin Brush, superintendent railway department Cumberland County Power & Light Company, Portland, Me.; S. T. Bale, J. G. Brill Company, Philadelphia, Pa.; W. L. Boyer, president Bemis Car Truck Company, Springfield, Mass.

C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y.; Bruce Cameron, superintendent of transportation United Railways, St. Louis, Mo.; W. A. Carson, general manager Evansville (Ind.) Railways; T. W. Casey, National Pneumatic Company, New York City; G. H. Caskey, auditor Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; E. F. Chaffee, O. M. Edwards Company, Syracuse, N. Y.; C. G. Chamberlin, W. H. Coe Manufacturing Company, Providence, R. I.; C. S. Ching, chief instructor Boston Elevated Railway, Roxbury, Mass.; S. K. Colby, Aluminum Company of America, New York City; R. C. Cram, assistant engineer Brooklyn (N. Y.) Rapid Transit System; H. D. Crampton, secretary Capital Traction Company, Washington, D. C.

D. B. Dean, J. G. Brill Company, Philadelphia, Pa.; J. H. Denton, Railway Utility Company, New York City; G. B. Dobbins, secretary Michigan Railway, Jackson, Mich.

A. H. Ehle, assistant sales manager Baldwin Locomotive Works, Philadelphia, Pa.

Thomas Farmer, Jr., Consolidated Car Heating Company, New York City; W. J. Flickinger, chairman efficiency committee, The Connecticut Company, New Haven, Conn.

N. M. Garland, Ohio Brass Company, New York City; J. E. Gibson, general superintendent Kansas City (Mo.) Railways; C. R. Gowen, general passenger agent New York State Railways, Syracuse, N. Y.; F. O. Grayson, president and general manager Grayson Railway Supply Company, St. Louis, Mo.; Alfred Green, Galena Signal Oil Company, New York City; S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.

A. A. Hale, Griffin Wheel Company, Boston, Mass.; W. J. Harvie, president Syracuse & Suburban Railroad, Syracuse, N. Y.; H. A. Hegeman, vice-president U. S. Metal & Manufacturing Company, New York City; F. W. Hild, general manager Denver (Col.) Tramway Company; J. M. High, Pantasote Company, New York City; L. W. Horne, vice-president and general manager Lord Manufacturing Company, New York City.

H. W. Irwin, Bay State Street Railway, Boston, Mass.

A. P. Jenks, General Electric Company, Chicago, Ill.

C. B. Keyes, General Electric Company, New York City; C. S. Kimball, engineer maintenance of way, Washington Railway & Electric Company, Washington, D. C.; G. L. Kippenberger, St. Louis (Mo.) Car Company; P. M. Kling, Laconia (N. H.) Car Company.

W. A. Lake, Pantasote Company, New York City; C. W. Laskay, Hale & Kilburn Company, New York City; N. Le Grand, St. Louis (Mo.) Car Company.

T. F. McKenna, Electric Service Supplies Company, Scranton, Pa.; R. C. Mills, second vice-president Sioux Falls (S. D.) Traction System.

H. N. Ransom, Westinghouse Electric & Manufacturing Company, New York City; J. P. Ripley, railway engineer J. G. White & Company, Inc., New York City.

Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J.; E. E. Soules, manager publicity and advertising Illinois Traction System, Peoria, Ill.; R. M. Sparks, general passenger agent Bay State Street Railway, Boston, Mass.; R. W. Spofford, general manager Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.; E. C. Spring, Philadelphia & Western Railway, Upper Darby, Pa.; Jerry Stanton, General Electric Company, Philadelphia, Pa.

A. D. B. Van Zandt, publicity agent Detroit (Mich.) United Railway.

J. W. Welsh, electric engineer Pittsburgh (Pa.) Railways; Howard Whitney, engineer maintenance of way Springfield (Mass.) Street Railway.

### The Chicago Special

The Chicago Convention train reservations indicate the largest Chicago special in several years. On Sept. 27, eighty-five reservations had been made with E. K. Bisby, passenger department, Pennsylvania lines, Chicago. The train will leave the Union Station, Chicago, at 11 a. m., Sunday, Oct. 8, and will make the regular Pennsylvania Limited stops that afternoon and evening, arriving at Pittsburgh at 11.40 p. m., and at Atlantic City at 9.30 a. m. Monday.

## COMMUNICATIONS

### Unit for Comparing Track Upkeep Costs

THE AMERICAN RAILWAYS COMPANY  
PHILADELPHIA, PA., Sept. 23, 1916.

To the Editors:

In reference to a practical unit of track cost which has been so ably discussed in your columns recently, I venture the opinion that the importance of any cost keeping is the end for which the costs are kept.

A manufacturing concern may, by standardization, reduce costs, or it may increase prices to cover known costs found by accurate cost keeping. Failing in either of the above expedients, the factory may close its doors.

The street railways have control of these factors in a very limited degree. In the case of track work, the total cost of maintenance per track mile is the most logical unit, as stated by Mr. Roundey in your issue of Sept. 16, and also the most workable. It is idle in this instance to say that some maintenance is extraordinary and some ordinary, as the total of both are chargeable to current operation unless the property has been able to set aside large maintenance reserves, and the reserve, in case there be such, must have come from operating expenses. If it appears desirable to gather exact knowledge of the comparative value of different types of construction under various operating conditions the matter becomes complicated to the point of despair. I agree with Mr. Cram when he states in your issue of Aug. 26 that the most careful accounting which he has seen is of little help if there is no one present during



the analysis who is familiar with all the construction details.

It is generally impossible for the accounting department to record so minutely the various details of any job, that without expert interpretation a cost of maintenance, per any conceivable unit, may be given in unqualified figures. For example, a piece of track may require maintenance on account of poor drainage, unsuitable ballast, tie renewals, joint failure, rail failure, bond failure or rapid destruction of paving, which may not have been foreseen by the engineer, or, if foreseen, proper materials may not have been obtainable. These partial failures may have been hastened by a change in volume or character of the traffic burden. If we assume that the variables have been determined with sufficient accuracy to evolve a workable unit then let us consider a municipal paving program which orders a street paved or repaved in the tenth or twelfth year of the life of the track, or which withholds permission to rebuild until, as happened in one case within the writer's knowledge, maintenance on a 2-mile stretch of double track was costing \$600 per month.

Should not the engineer keep his records of costs and details of construction in such shape that for any section of track he can give, with but little trouble, the detail suggested by Mr. West? By use of a suitable job order system any unit cost can be worked up as occasion requires, without undertaking the unprofitable task of trying to measure open track with hourly service by the same yardstick used to measure the paved special work with fifteen-second headway.

C. G. KEEN, Engineer Way and Structures.

## Encouragement in the Bay State Decision

BOSTON, MASS., Sept. 25, 1916.

To the Editors:

The abstract of the Bay State fare decision, published in your issue of Sept. 9, with the excellent editorial analysis of it in the same issue, gave a very clear statement of its salient features. The importance of the case has led me, however, during the past three weeks, to go over every page of the decision very carefully, with the result that I believe a great deal of encouragement can be drawn from it, even if the company did not receive permission to increase its rates in the one-fare zones from 5 cents to 6 cents. To indicate the reasons for this opinion the chief features of the case will be reviewed. The principal reasons cited by the commission for declining to authorize a general increase in rates may be summarized as follows:

1. That the company's valuation of its investment is too high by about 6 per cent.
2. That 7 per cent earnings are not necessarily a basis for a fair return in Massachusetts.
3. That annual depreciation charges should be, roughly, \$700,000 instead of \$1,000,000.
4. That fares on profitable lines should not be raised in order to carry along unprofitable ones.
5. That every possible means of increasing the business and raising the efficiency of the system should be exhausted before rates should be raised.

The commission frankly states, however: "In fixing this rate (6 per cent as a fair return) we must not be understood as ruling that a street railway company which finds it possible to declare dividends in excess of 7 per cent per annum may reasonably be required to reduce its charges. Each case must be judged upon its own merits."

This seems to be sound doctrine and will interest companies and commissions elsewhere but does not afford the Bay State Street Railway the relief requested. The commission evidently realizing this suggested a number of ways to assist the company as follows:

1. Regulation of jitneys, as the operators of this new form of public service ought to be subjected to proper regulation and to some of the obligations which the owners of the regularly established forms of transportation are by law compelled to observe."
2. The public must be prepared to expect in some instances reduction of service and should give its "sympathetic co-operation" by making sacrifices as the "larger good may seem to demand" in such matters as "a reasonable reduction in the present excessive number of stopping places," etc.
3. That "the entire system of street railway taxation may be in need of revising, and less onerous burdens should be imposed."
4. "It is unreasonable to expect the company to meet the cost of work on the street surface (paving, etc.) except in so far as it disturbs the surface itself."
5. "Through their local governments" the various communities served can "help to improve traffic conditions on the streets so that the operation of cars may not be unnecessarily impeded."
6. Also, they "can grant, without imposing undue restrictions, such new locations as may from time to time be necessary for the improvement of the service."
7. "In the judgment of the commission, the public can also be reasonably expected to make contribution in the form of some increase in fares."

The commission virtually concludes with the assurance that fares may be raised in the less populous districts and says: "If the company wishes to increase the prevailing fares upon these lines it is just and reasonable, in our judgment, for it to do so."

In another place the commission says that "the company ought to follow up the suggestions made by Mr. Arnold and other experts," and promises that it (the commission) "stands ready to assist and co-operate in every feasible and proper way." It is interesting to note that the Arnold recommendations, among other things, provided for the use of one-man cars and a speeding up of schedules.

The commission realizes that the company should have and is entitled to a greater net revenue. The tone of the decision as a whole is friendly to the street railway industry at large and shows a realization that it is about time to cry halt to electric railway baiting.

Railway service benefits two classes, the car rider and the property owner. It was established primarily for the benefit of the former, although the latter has been benefited to as great or even greater extent. The car rider supports the railway. The property owner may incidentally be a car rider too but often he rides in an automobile or may be a non-resident, all of which, of course, makes no difference. The question is why does the car rider who foots the transportation bills have to pay for paving and other excessive burdens levied on him indirectly through the medium of the railway and be deprived of transportation facilities which otherwise he could enjoy if it were not for these measures?

This thought seemed to be a strong factor with the Massachusetts commission in reaching its decision in this justly celebrated case for in denying a general fare raise at this time the note of warning is given in no uncertain terms that if the present 5-cent rate of fare is to be continued the railways must be relieved of "onerous burdens" and "excessive taxation."

OBSERVER.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Portable Controller for Moving Trucks in the Shops—Reinforced Trolley Splice for Catenary Construction—Straightening Poles with Pivoted Jack—New Contactor Signals—Long Bracket Arms Used During Construction—Automatic Slack Adjuster for Single-Truck Brake Rigging

### Unusually Long Bracket Arms

BY G. H. MCKELWAY

Line Engineer Brooklyn Rapid Transit System

In order to avoid interference between a cableway constructed by a contractor for digging a sewer in an important street and the span construction in use for supporting the trolley wire, it was necessary to remove the spans from the poles on the side of the street where the contractor was working and to support the trolley wire from mastarms attached to the poles on the opposite side of the street. Such practice on double-track lines is not common unless the tracks are at one side



LONG BRACKET ARM USED DURING CONSTRUCTION WORK

of the street where they can be spanned with ease by a comparatively short bracket.

In the work in question the tracks were in the center of a comparatively wide street, the width being 80 ft. between house lines and 44 ft. between curb lines.

In order properly to support the trolley wire over the far track it was necessary to make the arms 31 ft. 6 in. long, or of a length greater than the supporting poles, which were of steel and 30 ft. long. Not only were the arms actually longer than the poles but their apparent length was increased by the fact that the poles were set 6 ft. in the ground, so that the arms appeared to be almost 75 per cent longer than the poles.

The arms were made of 3-in. pipe, each supported by two guy rods leading up to the pole. As the poles were not long enough to take these rods at their proper angle the poles were lengthened by the insertion of wooden extensions set into the tubing after the caps had been removed. The arms were bolted to these extensions.

Owing to the nature of the street, which was a heavily traveled one, it was impossible to back guy the poles to relieve them of some of the strain from the arms but this was found to be unnecessary, and even bracing was not needed.

### Reinforcing Splices in Catenary Construction

BY M. E. HARDING

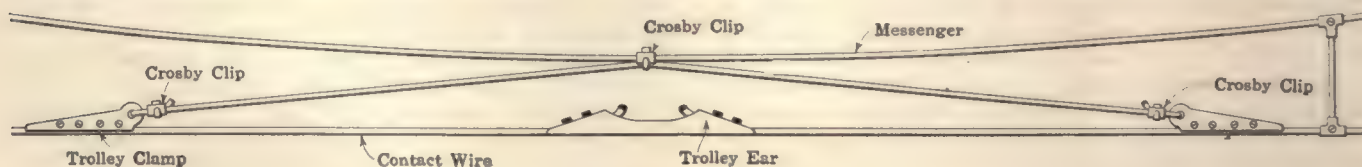
Engineer of Overhead Washington, Baltimore & Annapolis Electric Railroad, Annapolis Junction, Md.

A point of weakness in overhead construction is at the splices in the contact wire. This company had considerable trouble at one time due to the breaking of splicing ears, and to overcome this trouble two expedients were adopted. A new type of splicing ear was designed, and the spliced wire was reinforced by means of guys between the messenger wire and the contact wire, as shown in the accompanying diagram.

The feature of the splicing ear, a patent upon which has been granted to the writer, is that the wire is passed through a hole on the end at an easy angle so that it is practically not bent at all at the point of entry. The wire is clamped by means of two cap bolts, and as an extra precaution the end may be bent up as shown. The hole in the end of the ear is so low at the point of entry of the wire that a practically continuous bearing surface is provided for the trolley wheel or shoe.

The guying arrangement consists simply of a clamp ear attached about 18 in. on each side of the splice with a light stranded wire running up to the messenger and clamped to it by means of a crosby clip.

While on the subject of line work, it may be of interest to know that in putting in the splicing ears as described above we use ladders, and by so doing save considerable in expense which would otherwise be necessary for line cars. The interference with traffic is also less. These ladders we carry on regular cars tied on to the truss rods with rope. On the new cars we have hooks specially put on for the purpose and the rope is unnecessary.

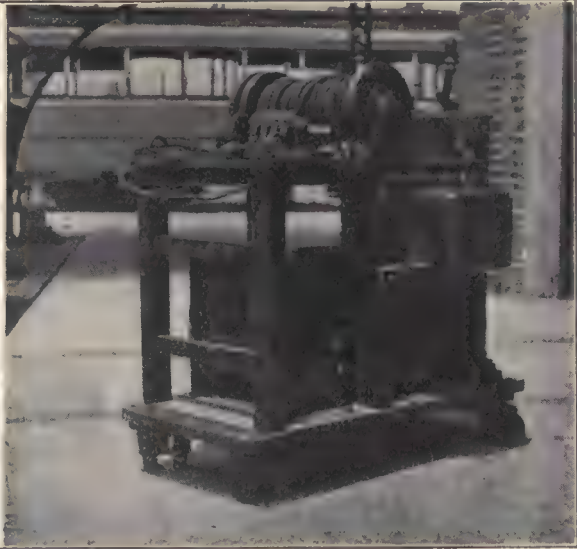


REINFORCEMENT OF SPLICE IN CONTACT WIRE USED BY WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC RAILROAD





VIEW OF PORTABLE CONTROL SET IN SERVICE



VIEW OF PORTABLE CONTROLLER

# Portable Controller Proves a Time-Saver

This Convenient Device Solves Problem of Moving Trucks in the Car Shops

BY H. C. EBELING  
Engineer Cleveland (Ohio) Railway

Trucks completely equipped are moved for short distances in the general repair shops of the Cleveland (Ohio) Railway Company by the aid of a portable control set. Power is supplied through the use of this equipment to the motors in a truck, thus making it unnecessary for the workmen to get beneath a car when it is elevated for either removing or replacing trucks. It also saves much time in performing this operation. This device was made at the suggestion of the general shop foreman and it has been found to be a very useful piece of equipment in the truck and motor shops. It was made portable so that it could serve all parts of a large shop building, and duplicates were supplied to the motor and truck repair shops. A view of this equipment is shown in the accompanying illustrations.

The operation of this portable control set is quite simple and is readily understood by the repair shop men. A contact board is laid on top of the motor, and the motor leads are slipped under the bronze contact springs. Energy is supplied through a flexible cord connection to

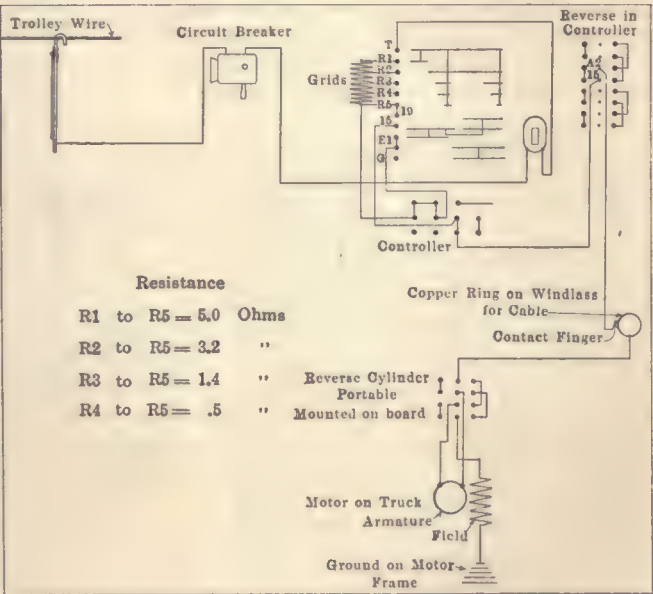
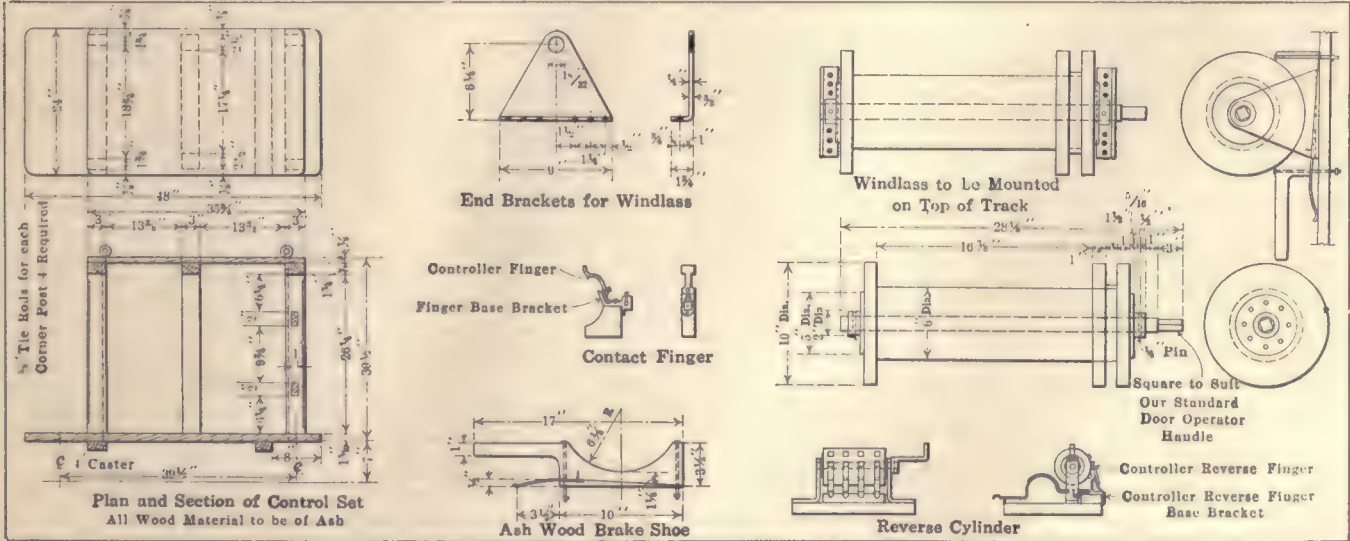


DIAGRAM OF PORTABLE CONTROL SET CONNECTIONS

the trolley wire which passes over each of the tracks in both the motor and truck repair buildings. When the power is turned on to move the trucks, a cable connec-



DETAILS OF CONSTRUCTION OF CONTROLLER OF PORTABLE CONTROL SET



tion between the controller and the truck is permitted to unwind from a drum as the truck moves along the track. A small reverse cylinder is also provided for use in case the motor connections are made improperly. A contact finger and ring on the drum supply a continuous path for the current from the trolley to the cable as it unwinds from the drum. The other features of this equipment are shown in the diagram on the preceding page.

## A New Contactor Signal Using Standard High-Speed Aspects

Recently Developed Signal Designed to Comply with Tests Recommended by the Block Signal Committee of the Association

The campaign for "safety first" which has been carried on for the past few years has had great influence on every branch of the railway industry, and to a marked degree on the signaling art, which is one of the pioneers in this movement. One of the most important developments of the past seventeen years is the contactor-operated signal for electric roads.

When electric railways began to use signals, they ran infrequent and low-speed cars and had small financial resources, and the old hand-thrown signal enabled cars to be operated with some degree of safety. As the service became more frequent, contactors were developed to operate these signals to save time and obtain greater safety. As the service was still more frequent it became necessary to develop signals so as to allow several cars to occupy the block at the same time while going in the same direction, and the registering mechanism was added. Later, with still higher speed, trouble began to develop with the contactors. It was also found as time went on and users of signals on electric railways obtained more experience with signals that false indications resulted from line wire troubles as in the earlier development of signals for use on steam roads.

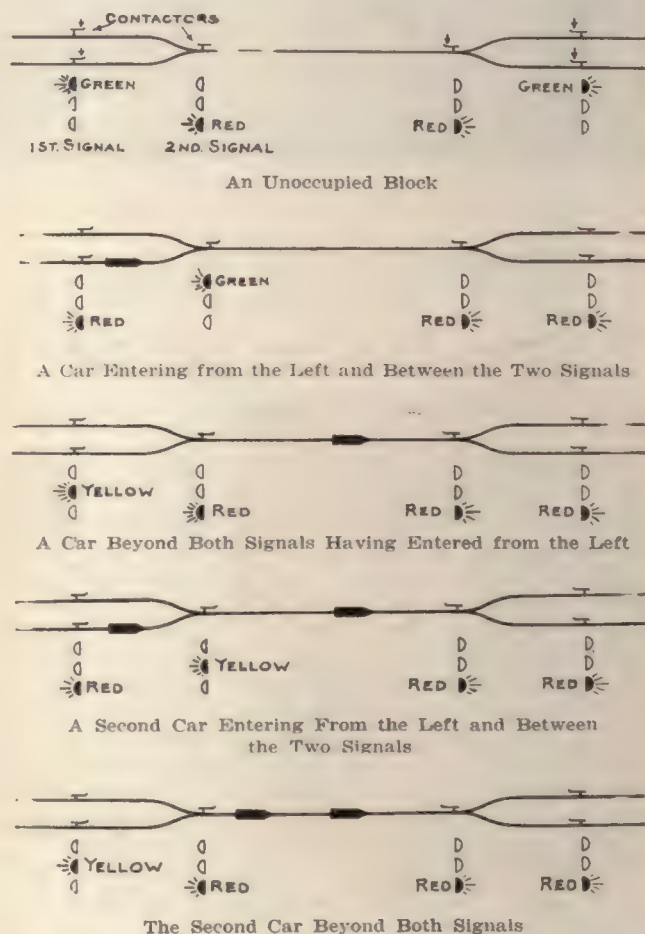
The engineers of the public service commissions and the signal committee of the Engineering and Transportation Associations began investigating this question, and this year the signal committee is recommending a set of tests which it considers a contactor-operated signal should meet in order to be safe, regardless of any of the unusual conditions which arise on any of the wires leading from the contactors or mechanism cases or regardless of the unusual car movements which sometimes take place. With these recommendations in mind, the United States Electric Signal Company, West Newton, Mass., has developed its new Type N registering signal and claims that this signal overcomes all of the objections to previous types of contactor signals enumerated above and meets all the tests being recommended by the signal committee.

In the type N signal, a three-light signal aspect case is mounted on a trolley pole slightly in advance of the point where the double track unites in the single track. A little further on, possibly one or two poles, and opposite the single track, is mounted a second three-light aspect case. The mechanism case is mounted on either of these two poles.

Approximately opposite the first signal on each branch of the trolley wire is mounted a contactor. Approximately opposite the second signal is mounted a third contactor. This makes three contactors at each end of the block instead of two as previously. The two contactors opposite the first signal are connected

together so that the operation of the signal is just the same whether a car enters the block from the right hand branch or the left hand.

From each contactor two wires run to the magnet controlled by it and, as the contactor is operated, two contacts are made in almost immediate sequence by a gravity-operated contact arm, whereby a very light charge is sent on one wire and a much heavier charge is sent on the other wire to the magnet. This magnet is so arranged that it will operate only if a very light charge is sent into it and then almost immediately thereafter a much heavier charge. This prevents the magnet from operating by a foreign feed, cross, break



ASPECT DIAGRAM, SHOWING THE SIGNAL INDICATIONS OF TYPE "N" SIGNAL WITH CARS MAKING THE DIFFERENT MOVEMENTS

or ground. It also avoids any danger that a false contact will be made in case the wire coming from the contactor chafes against the contactor or trolley wire or becomes broken and touches the trolley wire, and thus falsely registers cars out of the block.

The other end of the single track, of course, is equipped in the same way.

When there are no cars in the block, the first signal shows a green light and the second signal shows a red light. The two signals are of equal importance and the motorman is instructed that a green light means a clear track, or "Proceed." A yellow light means that there is a car in the block ahead moving in the same direction, or "Proceed with caution." A red light means "Danger, stop!" The meaning is the same on both signals.

A motorman approaching an unoccupied block sees a green light in the first signal and proceeds past it,



After the front of his car is past the first signal, the trolley wheel strikes the contactor which makes up the circuits for operating the registering-in magnet, the registering-in magnet lifts its armature, which is then locked up, and this movement causes a red light to show in both signals at the opposite end of the block. After the registering-in magnet has lifted its armature and registered the car in, a circuit is made up giving a green light in the second signal and putting a red light in the first signal behind the car.

It should be noted that it is the operation of the registering-in magnet which gives the "proceed" light in the second signal. While the motorman does not have to pay any attention to the registering of his car, still he will not get a "proceed" signal unless his car is properly registered in. The red light in the first signal now prevents another car from passing the first signal until the armature of the registering-in magnet is dropped back into operating position again, and this occurs as the trolley wheel strikes the contactor mounted approximately opposite the second signal. When the trolley wheel strikes this second contactor, which is just after the front of the car has passed the second signal, a circuit is completed to a magnet which pulls the lock from beneath the armature of the registering-in magnet and allows its armature to drop back by gravity into operating position again. When this ar-

contactor on the single track. This causes a control magnet to lift its armature, which is locked up, and when the trolley wheel thereafter strikes the contactor on either branch of the double track the registering-out magnet is energized and the armature of the control magnet is unlocked and falls by gravity, thereby cutting out the registering-out magnet circuit and again cutting in the registering-in magnet circuit. The contactors are made directional in this way. Therefore, as each car leaves the block it registers itself out on the registering machine, and when the last car has left the block the signals return to the normal condition indicating an unoccupied block.

If fifteen cars should enter the block, the number which the registering machine will take care of, then all of the signals go to danger and so remain until one of the cars leaves the block.

The Type N signal is not only designed so that the signals are always safe regardless of any combination of crosses, feeds, grounds or breaks which may occur on either the wires running from the contactors or the two line wires running through the block, but it provides also for what might be called unusual movements. Thus, suppose a car accidentally ran under a contactor in advance of a danger signal and discovering its error backs out. In the Type N signal if the car is registered in, in these circumstances it will also reg-



FIG. 1



FIG. 2



FIG. 3

FIG. 1—MECHANISM CASE OF TYPE "N" SIGNAL, SHOWING RELAY MOUNTED ON REMOVABLE SHELVES; FIG. 2—THREE-LIGHT ASPECT OF THE TYPE "N" SIGNAL; FIG. 3—RESISTORS AND FUSE PANELBOARD

ister itself out in the backing-up movement. If on the other hand, it failed for any reason to register in as it passed under the contactor, it would also fail to register out as it made the backing up movement under the contactor.

Again, suppose the power went off along the line when a car was at a stop with its trolley wheel under the registering-out contactor, and the breaker at the power house went in and out several times. With the Type N signal there would be no danger that a car would be registered out each time that the breaker at the power house was thrown in. It would be registered out once only. The manufacturers claim also that all other unusual movements likely to occur have been safely taken care of in this new signal.

The circuits are so arranged that as the trolley wheel passes the contactor on the double track the registering-in magnet is operated and its armature locked up, and as the trolley wheel thereafter strikes the contactor on the single track the registering-in magnet's armature is unlocked and dropped by gravity. If, however, a car is leaving the block, the trolley wheel first strikes the

ister itself out in the backing-up movement. If on the other hand, it failed for any reason to register in as it passed under the contactor, it would also fail to register out as it made the backing up movement under the contactor.

Again, suppose the power went off along the line when a car was at a stop with its trolley wheel under the registering-out contactor, and the breaker at the power house went in and out several times. With the Type N signal there would be no danger that a car would be registered out each time that the breaker at the power house was thrown in. It would be registered out once only. The manufacturers claim also that all other unusual movements likely to occur have been safely taken care of in this new signal.

#### GENERAL CONSTRUCTION

The aspect cases are three-light signals with spread-light lenses, ample background and substantial sun shields. Back of each lens are mounted two 23-watt lamps in parallel with a relay in series with the lamp normally in circuit, for cutting in the spare lamp if



the one normally in circuit burns out. While this signaling system operates from the trolley voltage, still the lamps burn at normal candle-power, regardless of the voltage fluctuations, by means of a simple current regulator which has been found entirely satisfactory in two years of actual service. This current regulator makes it practical to use an all-light signal for day as well as night indication with the lamps fed from the trolley voltage, for the candle-power remains constant in the lamps.

A high-speed contactor of very simple design is used with no side contact strips or other parts in the path of the trolley wheel to cause shock and uncertainty of contact at high speed. The contactor is placed on an ordinary ear and guyed into position so that the weight of the span hangs from the contactor, and this weight rests upon an adjustable spring in the contactor which is adjusted to carry all but about 10 lb. to 12 lb. of the total weight of the span. As the trolley wheel with the pole tension on it comes under the contactor, some of the weight of the span is relieved, and the spring moves a plunger upward. Near the end of its upward stroke, the plunger unlatches a gravity-operated contact arm which falls and makes the two contacts in predetermined sequence. As these two contacts must

be mounted all the resistances and fuses. The resistances have ferrules on their ends and are held in fuse clips so that they can be removed instantly in the same way as the fuses without disconnecting any wires or resistance holders. There is also a cut-out switch which, when opened, deadens the entire panel board, so that a maintainer is in no danger of shock or of causing short-circuits when working on the board.

On the back of the panel board and facing the other door are mounted a series of contacts. Also facing the other door are two shelves made of substantial insulating material, and these shelves slide in and out readily on guides. On the back edge of these shelves are spring-operated contacts which match and touch those on the back of the panel board when the shelves are pushed all the way in. On these shelves and connected to the spring-operated contacts are mounted all the relays, also the registering machine. If anything goes wrong with a signal, a maintainer can instantly pull out one of these shelves without making any disconnections, slip in another shelf and put the signal immediately into service. He then has the relays in his hands where he can thoroughly inspect them without danger of getting a shock, or he can take the shelf to the shop and repair any parts at his leisure. All

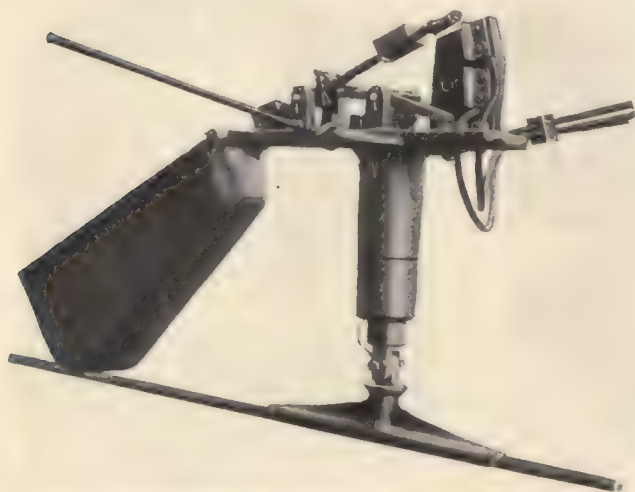


FIG. 4—HIGH-SPEED CONTACTOR FOR TYPE N SIGNAL, SHOWING COVER OPEN



FIG. 5—HIGH-SPEED CONTACTOR FOR TYPE N SIGNAL, SHOWING COVER CLOSED

be made almost instantly one after the other, the contact arm is operated by gravity to give the same speed each time, and as the trolley wheel operating the contactor simply unlatches this contact arm, the action of the arm is always the same regardless of the speed of the car. As the trolley wheel leaves the contactor, the plunger of the contactor moves downward, lifting the contact arm into operating position again and relatching it.

As the contact arm is only unlatched near the end of the upward stroke of the plunger of the contactor, it will not be operated by any swaying of the trolley wire such as might be caused by a trolley pole flying off and striking a nearby span wire. The contactor is so designed that expansion and contraction of the trolley wire does not affect its operation nor does creeping of the trolley wire. It has been successfully tried out in high-speed service for the past year and a half.

The mechanism case which is mounted on the trolley pole can be mounted either near the ground or higher as desired. It has two doors on opposite sides of the box. Just inside of one door is a panel board on which

of the coils are form-wound and insulated with "Micanite" inside and outside. Double insulation is obtained by mounting the coil frames themselves on the shelf of insulating material. The best of insulation is used throughout. There is no fiber. "Micanite" is used for the coils and "Bakelite" for mounting the contacts. The current consumption is small, and wear on the contacts which break the arcs is reduced to a minimum by double breaks and by reason of the fact that the heaviest circuit broken is  $\frac{1}{4}$  amp. The contacts on which the arcs are broken are easily replaceable by the removal of one small screw.

Summarized, the principal points of improvement which the manufacturers claim for this Type N signal over previous designs are as follows:

Fixed indications are used for a "proceed" indication instead of a momentary flash or movement of a part.

The responsibility on the motorman to watch the registering of his car is removed, yet he can not proceed unless his car is registered.

The same indication is used as the continuous track



circuit indication and it is read in the same way, so that one standard form of indication can be used for all types of signals instead of one for the continuous track circuit, another for the registering and still another for the non-registering signal as now.

The simplest form of indication is used, one which is standard for high speed and has stood the test of time and one which in all likelihood will not have to be changed in the near future.

The simple all-light signal is made practical for daylight indication, when operated by trolley current, by means of the current regulator.

The signal is safe regardless of any crosses, breaks, grounds or foreign feeds which may occur on the wires running from the contactors or the line wires running through the block or current going off the line.

The signal is safe regardless of any unusual movements which a car may make under the contactors.

The signal has full flexibility of operation. A car can enter the block or leave it at any point, entering either from the right or left and do it safely.

The contactors are operable at high speed, for nothing is placed in the path of the trolley wheel, and they are exceedingly simple.

The mechanism is easily maintained, for any unit can be immediately replaced by another without making any disconnections and by simply slipping one out and replacing with another.

The signal can be operated safely when a car is entering the block against a red signal sufficiently far to go around the turnout.

The signals all show "danger" when the full number of cars which the registering machine will protect has entered the block.

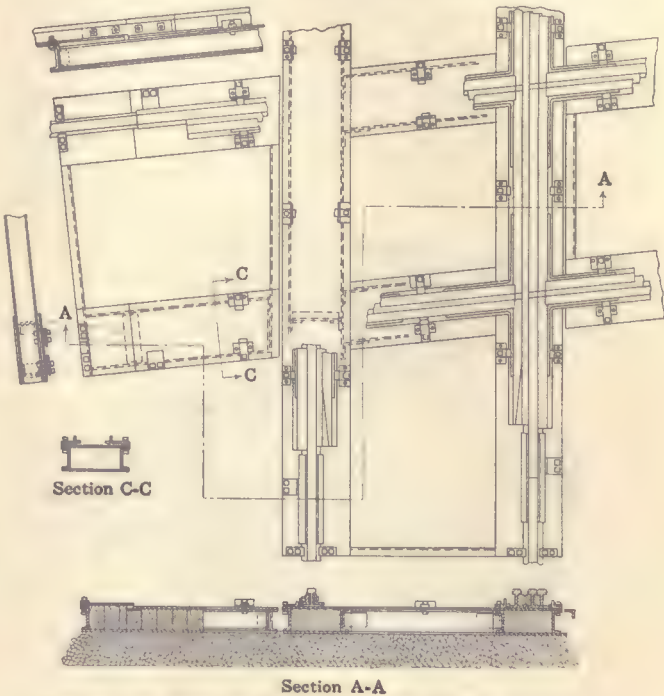
Simultaneous entry of cars at opposite ends of an unoccupied block gives "proceed" to one car and "danger" to the other.

# Steel Railroad Crossing Structures Growing in Favor

The Crossing Described Is Wood-Block Filled and Was Placed at a Labor Cost of About \$60

The structural-steel box-girder support as a substitute for the wooden ties to carry a railroad crossing has proved its superiority, and its use has been made standard on a number of interurban and steam railroads. At first these structures were filled with concrete, but recently creosoted wood block has been substituted by the International Steel Tie Company, Cleveland, Ohio, the manufacturers of this product, and the riding qualities of the structures have thereby been improved. The detailed construction of one of these steel crossing structures is shown in one of the accompanying illustrations. It will be noted that the structure is so designed that it furnishes a continuous support at

all of the joints in the crossing. The creosoted wood-block filler in the inside of the girder is laid transversely with the rail, thereby furnishing additional support to the top plate of the girder and it transmits the wheel loads to the bottom plate, thence to the ballast. The box girders are made up of 5-16-in. plates



PLAN AND SECTION OF WOOD-BLOCK FILLED CROSSING

on the top and bottom with 6-in. channels forming the vertical members. This provides a structure which will carry the heaviest steam railroad track loads over a span of 6 ft. In a number of instances these structures have been installed under practically wornout crossings, and the additional support thereby provided not only prolonged the life of the crossing but greatly improved its riding qualities.

The structure shown under the two crossings in the accompanying halftone was installed at the intersec-

Cost of unloading and trucking new substructure from car to point of installation.....	\$18.00
Trucking out and removing old substructure.....	20.00
Trucking old substructure.....	5.00
Placing new substructure.....	12.50
Back filling and surfacing.....	5.00

Total cost of unloading and placing new substructure and removing old..... \$61.38

tion of the Big Four Railroad and the Wheeling & Lake Erie Railroad at Wellington, Ohio. This structure was installed under a traffic consisting of forty trains each way on the double track line and eight trains each way on the single track line. The conditions at this point are practically the same as those existing at an intersection of an interurban line with a steam railroad, and the cost of installing this structure, given in the above table, should be of interest.

Statistics of the Portland cement industry in 1915, compiled by the United States Geological Survey, show that there was a slight increase in shipments and a slight decrease in production and stocks as compared with 1914. The shipments of natural cement in 1915 were 750,863 barrels, valued at \$358,627, a decrease in quantity of 422 barrels, and an increase in value of \$7,257 compared with those of 1914. The shipments of puzzolan cement in 1915 were 42,678 barrels, valued at \$39,801, a decrease in quantity of 25,633 barrels and in value of \$23,557 compared with the shipments of 1914.



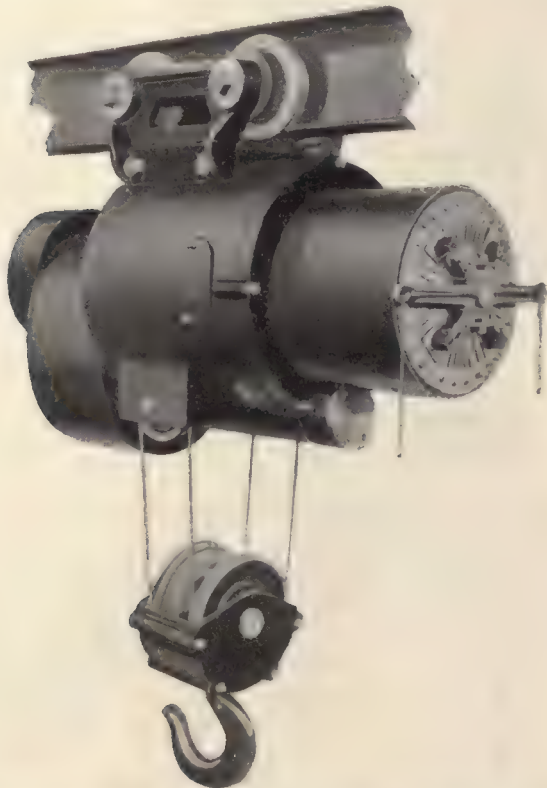
WOOD-BLOCK FILLED CROSSING, WELLINGTON, OHIO



## Roller Bearings Applied to Electric Hoist

The Economy Engineering Company of Willoughby, Ohio, has just placed on the market an inclosed electric hoist equipped with twelve Hyatt flexible roller bearings. Six of the roller bearings are used on the shafts to carry the gears, four in the trolleys and two in the load block as shown.

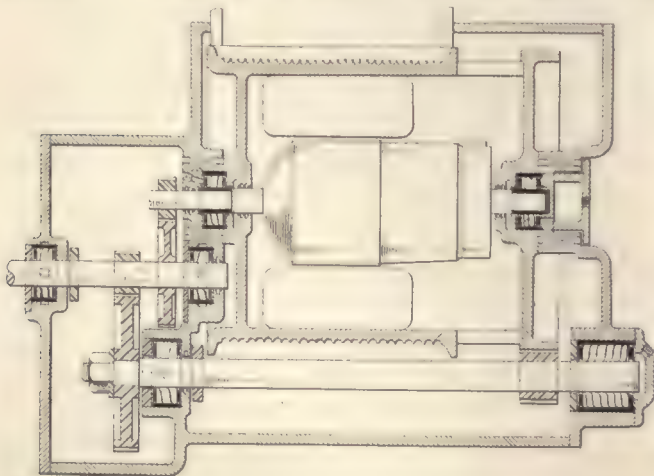
The frame is a cylindrical casting and supports the drum, brakes and motor. Openings in the frame allow these parts to be easily inspected after removal of the cover plate. The drum, which is made of cast iron, is centrally placed in the frame. It is grooved to take a



ELECTRIC HOIST SUITABLE FOR RAILWAY REPAIR SHOPS

rope for a given lift without overlapping. It also carries the drum gear and revolves about the armature of the motor, thus reducing the over-all size of the hoist and giving a high lift.

Any standard direct or alternating-current motor adapted for hoist service can be used with this device.

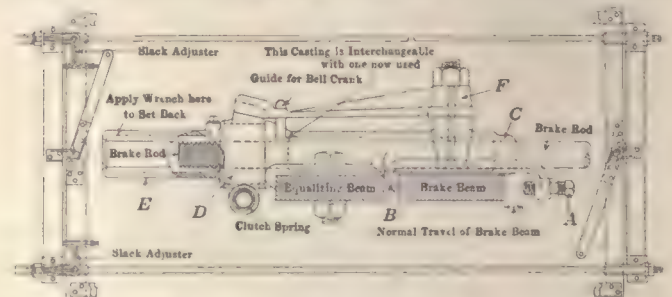


SECTION THROUGH HOIST SHOWING ROLLER BEARINGS

An automatic limit switch cuts off the hoisting motor when the block reaches the limit of its travel. The load is held in any position when the current is off by a solenoid-operated brake.

## Slack Adjusters for Any Type of Truck

One of the essential features of a successful brake slack adjuster is that it must be so flexible mechanically that it can be applied to any type of truck. In order to meet this condition the Anderson Brake Adjuster Company, Omaha, Neb., has just issued Bulletin A, showing how this automatic brake slack adjuster may be applied to a Brill 21-E single-truck brake rigging, to Taylor single-truck brake rigging, or to Peckham or St. Louis single-truck brake rigging. In its original form this slack adjuster was primarily designed for installation in the brake rigging of double-truck equipment, but the increased popularity in the single-truck, light-weight cars has made it necessary to redesign the adjuster so that it could be applied to any type of single truck. These adjusters are illustrated and their operation described in the bulletin.



AUTOMATIC SLACK ADJUSTER APPLIED TO SINGLE-TRUCK BRAKE RIGGING

In the accompanying illustration this automatic slack adjuster is shown as it has been designed for Brill 21-E single-truck brake rigging. The manner of its operation is described as follows: The adjuster consists of but three moving parts, namely, the inner and outer clutch members *D* and *E* and the bell-crank *F*. Assuming that the brakes are too slack, the operation is as follows: Upon applying and releasing them as in actual service the brake beam will travel beyond the distance predetermined by the set screw *A*. This turns the bell-crank *F*, which rotates the outer clutch member *D*. This slips upon the inner clutch part *E*, because the braking strain is on the inner clutch at the same time. When the brakes are released the brake beam strikes the bell-crank at *B* and returns it to its normal position after all the braking strain is off the brake rigging. In the release direction the bell-crank *F* and clutch parts *D* and *E* all turn as a unit and thus compensate for wear. In other words, upon the application of the brakes (if they are too slack) but two parts, *F* and *D*, of the mechanism turn, and upon the release of all three, *D*, *E* and *F* turn. None of these parts moves upon the normal travel of the brake rigging as provided for by the set screw *A*. In a brake rigging that is greatly affected by load, proper allowance for that condition must be made by the set screw *A*. The clutch adjustment is permanent and need never be changed.

The social and welfare organization work of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., is to be augmented by the organization of a band, for which twenty men have volunteered. A leader will be employed.



## Pivoted Jack Pulls or Straightens Poles

Although the jack which pivots on its base recently put on the market by Templeton, Kenly & Company, Chicago, was designed primarily to pull poles without digging around them, this tool has been found to be as readily adaptable to straightening poles. In one of the



VIEW OF JACK IN POSITION FOR STRAIGHTENING POLE

accompanying illustrations a telephone pole, which by reason of its angle or rake from the vertical carried more than its share of the load, is shown with one of these jacks in position ready for the straightening operation. One man was all that was necessary to complete this job. The non-slipping I-beam base was placed a short distance from the pole to serve as the bearing for the jack. The jack which is pivoted on its base, was then set in position and the head placed against the side of the pole at an inclination of about 45 deg.

In another of the accompanying illustrations the pole is shown again restored to the vertical position, and it required sixteen strokes to the lever to accomplish this. When the pole was practically in the vertical position, the dependable truss formed by the rack bar holding against the non-slipping I-beam base permitted the operator to step away from the pole to check the correct-



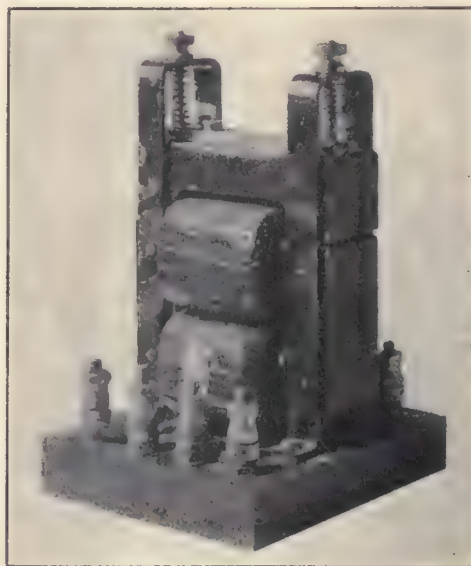
VIEW OF STRAIGHTENED POLE

ness of its position. When the pole had assumed the vertical position it was only necessary to retamp the earth around the base. In actual service this jack has also been found to be a most useful tool for pulling poles. As a matter of fact an average record of eight minutes for pulling 40-ft. poles was made on a recent job.

## A Testing Transformer for Signals

In order that there may be an assurance of continuous protection on electric railways, it is necessary that the different units used in connection with the signaling be tested regularly. A test of the apparatus directly connected to the track rails is doubly important because this is required to work under the greatest variation of potential between dry and wet weather. On long track circuits where ballast conditions are such that leakage from rail to rail is excessive, it is oftentimes necessary to operate relays at 50 per cent above normal potential in dry weather to allow the signals to remain in the clear position when no train is on the track section which they protect. To provide for the testing of these alternating-current relays, and particularly those used in connection with the track circuits, a special testing transformer has been designed, which is shown in an accompanying illustration.

The transformer is provided with an adjustable magnetic shunt. By varying the leakage flux, it is possible



TRANSFORMER USED IN TESTING ALTERNATING CURRENT RELAYS

to approximate ideal phase relations of the currents in the two windings of a relay when these are supplied from the same source. Several of these transformers have been manufactured recently by the Union Switch & Signal Company, Swissvale, Pa., and are being used by a number of railroads at the present time. These transformers can be used by most line department employees even though not specially trained in testing signal apparatus, since the instructions for their use are clear and simple.

All axles are scrapped by the mechanical department of the Springfield Consolidated Railway Company, Springfield, Ill., after they have given about 500,000 miles of service. Experience has demonstrated that the 4-in., 4¼-in. and 4½-in. axles used in city service become crystallized, and failures are more frequent after they have been in service that length of time.



## NEWS OF ELECTRIC RAILWAYS

### GRADUAL RETURN TO NORMAL CONDITIONS IN NEW YORK

#### Little Response to Sympathetic Strike Effort—Plan Suggested to Prevent Future Interruption of Public Service

The railways in New York whose employees are on strike have gone steadily on with the work of improving their service. As a result service on the lines during the non-rush hours in the daytime has been more than 75 per cent normal for the last week, while the number of lines and cars operated at night have been gradually increased so as to care for the need for transportation during the early evening hours on the north and south lines and on the cross-town lines. Except for the talk of a sympathetic walkout the strike is generally regarded by the newspapers as a waning issue, the space devoted to it being gradually decreased from day to day and made daily less prominent as an item of real news. As for the sympathetic strike, the date for such demonstration was put over from time to time and was finally announced for Wednesday. At this writing the figures which have been compiled for the sympathetic demonstration are so conflicting as to be of little or no worth. Each trade seems to be holding back for the other. As one union leader expressed it, the men he represented "did not propose to be made the goats of the situation."

While the companies have been going quietly about their work of rebuilding their transportation organizations, various bodies in no way directly concerned in the outcome of the issue have been at work petitioning here and there and advancing plans for possible intervention on the part of the public authorities. On Sept. 27 the Governor received a committee of Assemblymen who urged an extra session of the Legislature. He informed the committee that he saw no reason for calling a special session to devise means for ending the labor trouble. On the same day the State Industrial Commission voted three to two on a resolution to the effect that it would not be advisable to take steps toward a settlement of the strike at this time. On the previous day Chairman Straus of the Public Service Commission made another plea for arbitration. He said that the public had the right to demand arbitration, and that if it made its wishes known in strong enough language the operators would have to obey.

On Sept. 27 correspondence was made public between Theodore P. Shonts, president of the Interborough Rapid Transit Company, and L. G. Griffing, assistant grand chief of the Brotherhood of Locomotive Engineers, in which Mr. Shonts refused a request from Mr. Griffing asking a conference "for the purpose of discussing matters which we believe of mutual interest to the Interborough Company and to the organization which we represent."

The strike itself and the desperate efforts made by the leaders of the men to enlist the active co-operation of labor in other fields has naturally provoked a great deal of discussion as to means for preventing interruption of public service and for compelling contracts which are entered into to be lived up to scrupulously. Of the many suggestions made that of Henry R. Towne, former president of the Merchants' Association of New York, has perhaps attracted the greatest attention. As a result of the suggestion made by Mr. Towne, the Merchants' Association has decided to ask the Chamber of Commerce of the United States to take a referendum of its members. The resolution adopted by the board of directors of the Merchants' Association is concluded as follows:

"Resolved, That the tenure of service of employees of public service corporations, particularly of transportation corporations, should be regulated by law in such manner that each person who voluntarily elects to enter such employment shall, as a condition of such employment, be legally obligated by contract to continue therein for a specified term, during which term he may not lawfully quit that

employment, nor the corporation lawfully discharge him from its service, except as provided by such contract; and that such contract should provide adequate penalties for violation of its terms by either party."

Mr. Towne advocates an enlistment or enrollment contract for a stated period after a probational period in the case of new employees, renewable by mutual agreement; penalties for violation of the contract by either party, such penalty to consist of a cash fine, the fine against the company to be collected from a fund created by the company and vested in a trustee, the fine against the employee to be collectible from a fund created by the company retaining a percentage of the wages of each employee until the fund equals two weeks' wages, the company to pay interest on the fund and repay the principle and interest when the employee leaves the service, the schedule of the fine to be fixed by law and stated in the contract; the company to recognize the right of the employee to membership in any local organization and not to discriminate against him on such account; the employee to respect the right of the public to uninterrupted service and not to combine with others to cause its interruption; the employee to have the right alone or in combination with others to request concessions in wages and the hours of work or conditions of service; the employee to have the right to appeal from acts or decisions of the company to a joint board of award constituted under the law by joint action of the company and its employees as a board of arbitration; both the company and the employee to have the right to appeal from the rulings of the joint board to an appropriate Federal or State commission.

### PROGRESS REPORTED IN DALLAS NEGOTIATIONS

The Dallas traction and lighting controversy is yet unsolved, but it is reported that satisfactory progress is being made toward an agreement among all parties interested. Preparations are being made for the straw vote on the proposal to allow the electric railway and the electric lighting properties a valuation of \$8,500,000, as asked by them under the proposed reorganization, instead of the valuation of \$7,100,000 as fixed by E. W. Bemis.

In connection with the proposed reorganization, the Oak Cliff street car lines, operated by the Northern Texas Traction Company, a Stone & Webster Company, offer a big problem. Under the city's plan for consolidation of all street car lines in the city under one management, these lines would have to be purchased or leased by the new company that is to be formed, and negotiations have been under way for some time between C. W. Hobson and J. F. Strickland, who will head the reorganized company, on the one side, and representatives of Stone & Webster and the Northern Texas Traction Company on the other. It is understood that all offers for an outright purchase of these lines have been declined, but that the lease of these lines by the proposed new company is about to be agreed on.

In this connection Judge Charles F. O'Donnell, city attorney of Dallas, has been called to New York, where it is known that Mr. Hobson has been in conference with officials of the organization of Stone & Webster. It was also announced that the matter of leasing the Oak Cliff lines to Mr. Hobson had been under consideration in these conferences, and that City Attorney O'Donnell was wanted as a party to these conferences so that the conferees might know beforehand if the proposed terms of the lease would be satisfactory to the city of Dallas.

The contest involving certain charter changes and the model "service-at-cost" franchises that were adopted, on the face of the returns, in the election last April, has been set for Oct. 3 in the District Court, the three District judges in Dallas County sitting *en banc* to hear the case. This contest will have to be settled before anything definite is done in regard to the proposed reorganization of the properties or the lease of the Oak Cliff lines by Mr. Hobson.



### SAFETY FIRST FEDERATION CREATES NEW BUREAU OF STANDARDS

Charles L. Bernheimer, treasurer of the Safety First Federation of America and president of the Safety First Society of New York, has announced the establishment of a bureau of standards by the federation. The plan, which has been under consideration for some time, provides for a bureau which shall investigate the merits of various safety articles or devices to be submitted to it. This bureau, after thorough investigation, is to recommend to the directors for approval such devices as have measured up to the standards which will be adopted. If the directors approve the report of the bureau of standards and officially indorse the device or article, permission will be granted to the manufacturer, under certain restrictions, to use the official emblem of the Safety First Federation, and to stamp each article so endorsed with the federation's emblem and some such words as "Tested and approved, Safety First Federation of America, Inc."

Darwin P. Kingsley, president of the New York Life Insurance Company and president of the Safety First Federation, has agreed to act as chairman of the bureau of standards and has associated with him the following: Ernest P. Goodrich, formerly consulting engineer of the Borough of Manhattan, now assistant director of the bureau of municipal research in New York, and consulting engineer of the federation; E. E. Rittenhouse, ex-president of the Life Extension Institute, now commissioner, Public Service and Conservation, Equitable Life Assurance Society; Charles L. Bernheimer, president of the Safety First Society of New York, treasurer of the federation, director of the Chamber of Commerce of the State of New York and one of New York's well-known merchants; William Guerin, ex-chief of the fire prevention bureau of the city of New York, chairman of the federation's committee on fire prevention; George H. Robertson, automobile expert and chairman of the automobile technical committee of the federation; Joseph Tracy, consulting engineer; William Bondy, general counsel of the federation.

Plans have been perfected for a nation-wide campaign to educate pedestrians to use the crosswalks instead of crossing the streets diagonally, or in the middle of the block. For the purpose of raising funds to carry on this campaign, an appeal was authorized, to the owners of all motor vehicles to contribute sums of \$1 or more, the campaign to be conducted through the constituent organizations of the federation and through the co-operation of the newspapers.

The second annual convention of the federation will be held in Baltimore on Dec. 7, 8 and 9, at which time the members of the federation will be the guests of the Safety First Society of Baltimore.

### ONTARIO HYDRO-ELECTRIC RAILWAY UNION PROBLEMS DISCUSSED

At a meeting in Hamilton, Ont., on Sept. 1 of representatives of municipalities in the Province of Ontario between Niagara Falls and Toronto it was decided to ask the Ontario government to allow the municipalities to take over complete control of the hydro-electric undertakings, consisting of the main transmission lines from Niagara Falls to Hamilton constructed some years ago by the Ontario Hydro-Electric Power Commission on behalf of the municipalities, and the present projected system of hydroelectric railways. It was also decided to seek legislation at the next session of the Legislative Assembly amending the acts which were passed at the last session. In the opinion of the municipal representatives these acts tended to impede the progress of hydro development, particularly the proposed diversion of the Niagara and Chippewa Rivers.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, which has jurisdiction over the proposed system of hydroelectric railways to be constructed in the Niagara and Western Ontario districts, in addressing the convention urged that the municipalities should take over the responsibility of the proposed Chippewa development.

He traced the development of the hydro system from the beginning. It was imperative that the Chippewa development scheme should be commenced forthwith. Premier Hearst had declared in the Legislative Assembly that if the

municipalities passed the necessary by-laws, work could be proceeded with. It was therefore suggested that the 120 municipalities interested should submit by-laws to the rate-payers authorizing the municipalities to enter into contracts with the Ontario Hydro-Electric Commission authorizing the commission not only to supply power but also to develop it.

F. A. Gaby, chief engineer of the Hydro-Electric Power Commission, outlined the plan for the development of the proposed hydro-radial scheme for the Niagara peninsula and the district along the north shore of Lake Ontario to Toronto. He stated that the cost of the proposed line between Port Credit and Niagara Falls, which will be connected with the line proposed to be constructed west from Toronto to London, will be \$11,263,363. This will cover all equipment and rolling stock and provide for contingencies. Provision was made in the estimates for terminals costing \$600,000. Of this sum \$200,000 was the estimated cost of the Hamilton terminal.

Sir Adam stated on Sept. 1 that an offer had been made to the Dominion Power & Transmission Company to take over its radial line to Burlington and Oakville, a distance of 22 miles. The radial line to Burlington was completed in 1898 and extended on to Oakville in 1904.

Within the next few weeks the municipalities in the Niagara-Hamilton-Toronto district will ask the Ontario government for orders in council permitting the people to vote on the proposed hydro-radial railway project. This line, it is expected, will be linked up with the proposed Toronto-London-Stratford hydro line.

### ENGINEERS OFFERED PRIZES FOR PAPERS

Cash prizes of \$50, \$30 and \$20 are offered by the engineers' subdivision of the Chicago Association of Commerce for the three best papers, not to exceed 3000 words, on any one of the following subjects:

- (1) "Engineering and Civic Progress."
- (2) "The Engineer of the Future."
- (3) "The Business Relation of the Engineer to the Commercial World."

Relationship of the engineer and of engineering to the business and professional world; how best to realize the conceived ideal of engineering, concrete examples illustrative of the true significance of engineering, such as a brief prospectus of a proposed work or a short, crisp, readable news article on a piece of engineering construction—these are suggested lines for development. The contest is open to undergraduates and to graduates of any recognized school of engineering in the United States during the years 1915 and 1916.

The judges of the relative merits of the papers will be F. H. Newell, professor of civil engineering, University of Illinois; John W. Alvord, consulting engineer, Chicago, and John F. Hayford, director, College of Engineering, Northwestern University. All papers should be mailed to Engineers' Subdivision Contest, the Chicago Association of Commerce, 10 South La Salle Street, Chicago, and must be received not later than Nov. 1, 1916.

**Joint Congress Committee on Railroads to Meet Nov. 20.**—The Railway Business Association has issued a bulletin which declares that "the enormous increase in operating expenses compelled by the eight-hour law accentuates the necessity for general legislation designed to bring regulation into proper relation with the facts of the business as they exist." The legislation proposed is to be advocated before the joint committee of Congress which has set hearings to begin Nov. 20 and is to report in January, 1917.

**Proposal for Reduction in Wages Formally Presented.**—The Bay State Railway, Boston, Mass., has submitted to the members of Division 235 of the Amalgamated Association a request that a reduction in wages, similar to the scale of prices in effect in 1914 be the working schedule to replace the agreement which expires on Oct. 1. This would mean a reduction from 30 to 28 cents an hour for a maximum, a drop from 25 to 24 cents an hour for the minimum and a change in the sliding scale from five to seven years. A new agreement from the union calling for an advance in wages and better working conditions has been submitted to the company.



**Committee Recommended to Study Pittsburgh Transit.**—In a communication to Mayor Joseph G. Armstrong and the City Council of Pittsburgh, Pa., the committee on city transit of the Chamber of Commerce has recommended the appointment of a commission to study the local transit problem. It is suggested that the commission be composed of fifteen members, including the director of the department of public works, to serve without remuneration, but that an appropriation of \$100,000 to \$125,000 be available for the general expenses of the investigation. The commission would render a report within a year to the Mayor and Council, giving recommendations "upon a comprehensive rapid transit system for the city, with plans showing routes, stations, number of tracks and general construction, whether subway, surface or elevated, with estimates of cost of construction, carrying capacity and gross and net income."

## PROGRAM OF ASSOCIATION MEETING

### National Safety Council

The annual meeting and congress of the National Safety Council will take place at the Hotel Statler in Detroit, Oct. 17 to 20. The development of the council's work has indicated the need for intensive study of the problems of various industries, so that the main feature of the meeting this year is sectional conferences. For instance, the electric light and gas industry members will be assembled in the public utilities section; the foundry members in the foundry section, and the cement members in the cement section. The electric railway sectional meeting will be held on Oct. 19. The chairman of the section meeting is George Oliver Smith, supervisor of safety of the Doherty Operating Company, New York, N. Y., and the vice-chairman is Edward C. Spring, assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa. The addresses to be presented are as follows:

"How Graphic Charts and Bulletins Help in Safety Education," by Harold W. Clapp, general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio.

"Safety and Efficiency—How a New Member Tackles the Problem," by Julien H. Harvey, superintendent of efficiency of the Kansas City (Mo.) Railway.

"How the Safety Movement Is Helping the Electric Railway Industry Meet Its Problems," by H. H. Norris, associate editor of the *ELECTRIC RAILWAY JOURNAL*, New York.

"The Application of the National Electric Safety Code to Electric Railway Construction and Operation," by W. J. Canada, electrical engineer of the Bureau of Standards, Washington, D. C.

"Safety Devices on Street and Interurban Cars," by Charles H. Cross, secretary of the central safety committee of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

"Warnings at Interurban and Obstructed Crossings."

"Hazards of Power Houses and Carhouses and Their Remedies."

"Methods of Instructing New Motormen in Their Duties," by H. B. Adams, safety supervisor of the Aurora, Elgin & Chicago Railway, Aurora, Ill.

There will also be an address by F. R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, on a subject to be announced.

Fifteen minutes will be allowed for the discussion of each of the papers presented. Representatives of electric railways will also be interested in the proceedings of the employees' benefit association sectional meeting.

A new feature of the congress this year will be a mammoth safety exhibit, where the latest types of safety devices will be shown.

It is planned during the congress, if possible, to select a universal danger sign. In preparation members have been asked to consider and test several signs of which samples in colors have been distributed. These show: red circle on black ground; red circle with concentric blue and yellow rings on black ground; red circle on white skull and crossbones, superimposed on blue circle and yellow background, and red circle on white skull and crossbones, superimposed on black circle surrounded by yellow rings, all black background.

# Financial and Corporate

## ANNUAL REPORTS

### Interborough Rapid Transit Company

The comparative income statement of the Interborough Rapid Transit Company, New York, N. Y., for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation.....	\$34,182,100	95.24	\$32,365,306	96.80
Other operating revenue.....	1,709,427	4.76	1,068,436	3.20
Gross operating revenue.....	\$35,891,528	100.00	\$33,433,742	100.00
Maintenance of way and structure—actual.....	\$1,539,216	4.29	\$1,545,949	4.62
Maintenance of equipment—actual.....	2,132,339	5.94	2,002,095	5.99
Total maintenance.....	\$3,671,556	10.23	\$3,548,045	10.61
Maintenance of way and structure—depreciation....	\$288,103	.80	\$192,881	.57
Maintenance of equipment—depreciation.....	331,122	.92	368,334	1.11
Total depreciation.....	\$619,225	1.72	\$561,215	1.68
Total "maintenance" appropriation.....	\$4,290,781	11.95	\$4,109,260	12.29
Traffic expenses.....	542	.00	145	.00
Transportation expenses.....	8,330,357	23.22	7,615,957	22.79
Accident and damages.....	551,886	1.54	386,244	1.14
General expenses.....	834,597	2.32	829,707	2.49
Total operating expenses.....	\$14,008,165	39.03	\$12,941,314	38.71
Net operating revenue.....	21,883,362	60.97	20,492,428	61.29
Non-operating income.....	580,830	1.62	623,631	1.86
Gross income.....	\$22,464,193	62.59	\$21,116,059	63.15
Deductions from income:				
Taxes.....	\$2,341,606	6.53	\$2,133,980	6.38
Interest on bonds (rental).....	4,085,440	11.38	4,001,146	11.97
Manhattan dividends (rental).....	4,200,000	11.70	4,200,000	12.57
Manhattan cash rental.....	35,000	.10	35,000	.10
Interest on notes and 5 per cent bonds.....	3,043,630	8.48	2,632,572	7.87
Sinking fund 5 per cent bonds.....	.....	.....	.....	.....
Amortization.....	312	.00	.....	.....
Interest on unfunded debt.....	37,500	.10	37,500	.11
Other rental deductions....	7,376	.02	7,376	.02
Total.....	\$13,750,866	38.31	\$13,047,575	39.02
Net corporate income.....	\$8,713,326	24.28	\$8,068,484	24.13

The gross operating revenue for the year increased \$2,457,785 or 7.35 per cent, the result of a gain on the subway division of \$1,513,457 or 8.48 per cent, and on the Manhattan Railway division of \$944,327 or 6.06 per cent. The increase on the subway division was to the extent of \$1,296,296 the result of an increase in passenger revenue, and to the extent of \$217,161, an increase in sale of power and in other operating revenue. The increased subway traffic may be attributed to the revival of business evidenced in the autumn of 1915, which continued substantially unbroken to the close of the fiscal year. The increase on the Manhattan Railway division of \$944,327 was the result of an increase in passenger revenue of \$520,498, and in sale of power and in other operating revenue of \$423,829. The increase in passenger revenue on the Manhattan division took place in the last six months of the fiscal year and reflected the improved facilities afforded by the third tracking of the elevated lines, which were opened for operation Jan. 17, 1916.

The report states that the increase in passenger travel on the Manhattan Railway division is very gratifying. Without any of the northern terminals, extensions or feeders being included in this operation, there was an increase between Jan. 17, 1916, and June 30, 1916, of 11,893,155 passengers, as compared to a decrease of 976,972 passengers for the first six months' period of the present fiscal year, and 461,904 for the first sixteen days in January. During this same period there was an increase of 15,840,859 passengers on the subway division as compared to an increase of only 6,216,718 for the previous six months.

The operating expenses in 1916 showed an increase of \$1,066,851 or 8.24 per cent, the result of an increase on



the subway division of \$672,121 or 10.83 per cent, and an increase on the Manhattan Railway division of \$394,730 or 5.86 per cent. The charges to operating expenses for maintenance and depreciation of both way and structures and equipment were \$181,520 more than similar charges for the previous year.

The increase in traffic on both subway and elevated divisions, as well as the enlarged express service upon the elevated lines, led to an expansion of the train service, resulting in an increase in car mileage on the subway division of 3,772,304 car-miles and on the elevated division of 1,255,749. This increase in car mileage, the shortening of the hours of station men and increase in rates of pay of transportation employees, were responsible for the increase in the cost of transportation amounting to \$714,400.

The net operating revenue increased \$1,390,933 or 6.79 per cent, the result of a gain on the subway division of \$841,336 or 7.23 per cent, and a gain on the Manhattan Railway division of \$549,597 or 6.21 per cent. The total amount of taxes increased \$207,626 or 9.73 per cent, the subway division showing an increase of \$61,257 or 13.85 per cent, and the Manhattan Railway division an increase of \$146,368 or 8.65 per cent.

The income from operation showed a gain of \$1,183,307 or 6.44 per cent, the result of increase on the subway division of \$780,078 or 6.96 per cent, and on the Manhattan Railway division of \$403,228 or 5.63 per cent. The non-operating income decreased \$42,800 or 6.86 per cent, principally due to the decrease in interest on bank balances and loans and reflects the temporary advances from general cash for the purposes of the construction of the Manhattan third tracks and power plant improvements.

The gross income increased \$1,140,506 or 6.01 per cent, the result of a gain on the subway division of \$763,024 or 6.53 per cent, and a gain on the Manhattan Railway division of \$377,482 or 5.17 per cent. Income deductions, however, also increased \$495,664 or 4.54 per cent. The surplus over dividends of 20 per cent on the capital stock was \$1,892,014, a gain of \$817,867 over the previous year.

The number of passengers carried was 683,752,114 compared with 647,378,266 last year, an increase of 36,373,848 or 5.62 per cent, the result of a gain on the subway division of 25,919,569 or 7.50 per cent, and a gain on the Manhattan Railway division of 10,454,279 or 3.46 per cent. The subway division was benefited by the improvement in general business conditions during the last ten months of the year, and it received the continuing advantages derived from the building up of the territory contiguous to the subway lines, while the Manhattan division, where the increase was confined to the last half of the year, reflects the result of an improved express service following the opening of the third tracks, as before stated.

Expenditures for additions and betterments during the year aggregated \$28,063,562. They included payments made on account of construction and equipment of new subways and Manhattan Railway third tracks and extensions, as well as power plant improvements.

Claims, suits and judgments caused an increase of \$155,523 in expenditures, while the expenses rose \$15,726. The increase in the expenditures for accidents was principally due to the settlement of the remaining claims arising out of the short-circuit smoke accident at Fifty-third Street and Broadway, collisions on the elevated, and the accidents at center and side doors due to the increasing congestion. The space closing devices are said to be reducing the number of injuries due to the spaces at the curved platforms, but the accumulated space claims for the past have increased and it will be some time before the benefit of the new devices will show in reduced claims. At the close of the fiscal year there were 115 less suits in the courts of record, although seventy-one more such suits were commenced than during last year. The claimants were successful in a smaller percentage of cases tried than the previous year. The total disbursements for injuries and damages and expenses amounted to 1.91 per cent of the gross passenger receipts in the last year, an increase of 0.37 per cent over 1915.

The wages of employees were increased during the year in the sum of approximately \$349,000. This sum, however, does not include the increases granted to conductors, motor-men, guards, agents, porters, gatemen, special officers, start-

ers, towermen, switchmen and train clerks, effective on Aug. 1, 1916, amounting to about \$311,000 additional.

#### Pacific Electric Railway

According to the annual report of the Pacific Electric Railway, Los Angeles, Cal., covering the year ended June 30, 1916, the passenger earnings were \$187,496 less than during the year preceding, notwithstanding the expositions. A résumé of the income statement gives the following figures:

Railway operating revenue.....	\$8,856,796
Railway operating expenses.....	5,994,611
Net revenue from railway operations.....	\$2,862,185
Taxes .....	515,556
Railway operating income.....	\$2,346,628
Other income .....	37,301
Gross income .....	\$2,383,929
Interest on bonds and floating debt, bond discounts, rents, etc. ....	3,205,664
Amount by which the company failed to earn fixed charges .....	\$821,734

In commenting on these figures, President Shoup stated that the competition by practically unregulated automobile carriers is directly responsible for most of the deficit from the year's operation.

#### Chosen Light Railways and Tramways

According to the report of the railway bureau of the government-general of Chosen (Corea) for the year ended March 31, 1915, the open lines at the end of the year were 44.5 miles in length, and their construction expenses amounted to yen 2,799,474. These lines belong to the Chosen & Gas & Electric Company (5.8 miles, steam), the Zenhoku Light Railway (15.5 miles, steam), the Nikkan Gas & Electric Company (16.2 miles, electric), Kankyo Provincial Government (5.1 miles, hand), the Heijyo Street Tramway (1.2 miles, hand), and K. Mori (0.7 miles, hand). Thus there are 21.3 miles operated by steam, 16.2 miles by electricity and 7 miles by hand. The total length of lines not yet opened is 173.2 miles. The train mileage in the fiscal year reached 53,284 miles, and the car mileage 2,572,536 miles for passenger cars and 265,777 miles for wagons, making a total of 2,838,313 miles. Passengers carried numbered 11,286,473 by electric cars and 294,479 by other cars. The traffic receipts amounted to yen 375,454 and the expenditure to yen 283,657, leaving a balance of yen 91,797 as profit.

#### New South Wales Government Railways and Tramways

The results of operation of the government railways and tramways of New South Wales, Australia, for the year ended June 30, 1916, was a deficit of £137,457 as compared to a profit of £66,804 for the year preceding. This deficit was caused by the operating loss of £223,749 for the steam lines, for the tramways in the last year showed a profit of £86,292. The tramway earnings in 1916 amounted to £1,991,628, with working expenses of £1,602,650 and interest of £302,686. The earnings for the year showed an increase of £5,568 or 0.28 per cent, while the working expenses decreased £8,636 or 0.54 per cent.

The total capital expenditure for all tramway lines open to traffic on June 30, 1916, amounted to £8,166,423. The expenditures charged to capital account during the year were £196,130. In the last year 292,021,744 passengers were carried, an increase of 2,738,929. A total of 26,451,442 tram miles were run, a decrease of 391,532. Of the 48,757 employees (railways, 39,182; tramways, 9575) 5608 men had joined the expeditionary forces up to June 30, 1916. Of these 199 were killed or missing, and 300 others had been wounded. The added expenses of all lines attributable to the war were £461,524, while free transportation for war purposes was furnished to the extent of £170,000 on the basis of the usual rates.

A number of railway extensions are under construction, while others have been authorized. In consequence of the war, and owing to the difficulties of obtaining supplies, the improvements have not been advanced as rapidly as desired, especially the proposed steel bridge connecting Sydney with the North Shore, the installation of electricity on suburban lines and the construction of the Sydney underground railway.



### UNITED RAILROADS REORGANIZATION PLAN ANNOUNCED

The reorganization committee for United Railroads of San Francisco, Cal., has announced a plan which involves the extinguishment of \$44,330,100 out of the present \$91,928,100 of capital liabilities. The plan provides for the transfer of all the assets of the United Railroads of San Francisco and the San Francisco Electric Railway to the Market Street Railway, which will become the operating company. In consideration of this transfer bondholders of the United Railroads will receive 25 per cent of face value of present 4 per cent bonds in Market Street Railway 5 per cent bonds and 46 per cent of par value of their 4 per cent bonds in new 6 per cent cumulative first preferred stock of the Market Street Railway. The holders of unsecured notes and of stock of United Railroads will cause to be underwritten by the California Railway & Power Company at 90 per cent of their face value \$2,500,000 of serial debentures to be presently issued and \$3,000,000 of Market Street Railway 5 per cent bonds to be taken in 1918 or before. The proceeds of the debentures are to be used to redeem and discharge underlying bonds totalling \$5,200,000, all of which are now maturing or will mature within two years. The holders of unsecured notes and stock of United Railroads will receive new second preferred and common stock of the Market Street Railway and surrender of certain obligations for their underwriting the above-mentioned securities and for causing the conveyance of the properties to be made by United Railroads of San Francisco to the Market Street Railway. The capitalization of the Market Street Railway will be \$16,098,000 of 5 per cent bonds, \$2,500,000 of 6 per cent debentures, \$11,000,000 of first preferred stock, \$5,500,000 of second preferred stock, and \$12,500,000 of common stock, a total capitalization of \$47,598,000.

**Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.**—Consolidation of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro Electric Light & Power Company, Waynesboro Gas Company, Carlisle & Shippensburg Street Railway, Shippensburg Gas Company, Shippensburg Water Company and the electric light and power companies operating in Guilford, Quincy, Washington and Antrim townships, in Franklin County is reported again under consideration. Hambleton & Company, Baltimore, are the bankers who are said to be interested.

**City Railway, Mount Vernon, Ill.**—The City Railway has made application to have a receiver appointed for its property, consisting of the 3 miles of track and three cars. The company was incorporated in 1914 and after constructing the line, cars were operated until Feb. 16.

**Consolidated Cities Light, Power & Traction Company, New York, N. Y.**—J. S. Orlor & Company, Inc., Boston, Mass., are offering for subscription first mortgage 5 per cent gold bonds of the Consolidated Cities Light, Power & Traction Company guaranteed principal and interest by the Cities Service Company. The bonds are dated July 1, 1912, and are due July 1, 1962.

**Illinois Traction Company, Peoria, Ill.**—The Illinois Traction Company has filed with the Public Utilities Commission of Illinois a petition asking the commission to authorize the St. Louis, Springfield & Peoria Railway to issue first and refunding bonds amounting to \$392,000.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.**—In its annual report to the Public Service Commission of Indiana for the fiscal year ended June 30, 1916, the Indianapolis Traction & Terminal Company shows that its net earnings amounted to \$301,452, an increase of \$152,684 for the year. Passenger revenues totaled \$3,072,332, an increase of \$183,267. During the year the company carried 72,275,389 revenue passengers, 22,703,823 transfer passengers and 2,087,700 employees, policemen and other free passengers. The average fare per revenue passenger was 4.20586 cents, and the average fare for all passengers carried, including transfer and free passengers, was 3.23815 cents. The report shows that the book value of the property is now \$11,434,589, and its total investment \$12,346,748. During the year the company paid out for interest on funded

debt \$222,417; interest on unfunded debt, \$21,080; taxes, \$273,965; accidents and damages, \$125,483, and salaries and wages, \$1,195,247.

**Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.**—It is said that minority stockholders of the Lake Erie, Bowling Green & Napoleon Railway will become a party to the plan to prevent the purchaser of the property of the company from scrapping the line. They will take part in the injunction suit recently filed to prevent this step. They allege that a profit on the investment could probably be realized under careful management. The decision of the Ohio Public Service Commission in refusing to prevent the abandonment of service on the line is referred to at length in this issue on page 697.

**Paris (Tex.) Transit Company.**—The Paris Transit Company has filed an amendment to its charter with Secretary of State McKay at Austin, certifying to an increase in its capital stock from \$150,000 to \$160,000.

**Public Service Corporation of New Jersey, Newark, N. J.**—The monthly financial statement of the Public Service Corporation of New Jersey for August shows a gross increase of \$435,678 in total business over August, 1915, a percentage of increase of 14.4. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus was \$392,417, and the increase in surplus available for dividends over the corresponding month of 1915 was \$89,728. For the eight months ended Aug. 31, 1916, the gross increase in total business amounted to \$3,206,776, an increase of 13.3 per cent. The balance available for amortization, dividends and surplus was \$3,364,607, and the increase in surplus available for dividends amounted to \$790,065.

**Southern Cambria Railway, Johnstown, Pa.**—The Southern Cambria Railway, on which a wreck occurred on Aug. 12 costing the lives of twenty-six people, has placed its property in the hands of a trustee, James P. Thomas, according to papers filed at the court house in Johnstown. This action was taken, it is reported, in anticipation of heavy claims for damages growing out of the accident.

**Union Traction Company of Indiana, Anderson, Ind.**—The report of the Union Traction Company of Indiana to the Public Service Commission of Indiana for the fiscal year ended June 30, 1916, shows a total investment of \$23,277,985, an increase of \$78,982 for the last year. The book value of road and equipment is \$22,977,980, an increase of \$55,159. The railway operating revenue for the year was \$2,621,780, an increase of \$167,879 over the previous year. The railway operating expense was \$1,511,255, leaving a net revenue from railway operations of \$1,110,524. Gross income totaled \$1,008,819; interest on funded debt, \$666,209, and deductions from gross income, \$854,779, leaving a net income of \$154,039. The total passenger revenue for the year was \$2,190,932, an increase of \$137,263. The number of revenue passengers carried was 15,737,969. The total freight revenue was \$232,639, and the total express revenue, \$84,397. Injuries and damages cost \$104,502, and salaries and wages amounted to \$835,472.

**Waupaca Electric Light & Railway Company, Waupaca, Wis.**—The plant and good-will of the Waupaca Electric Light & Railway Company, Waupaca, Wis., has been sold to E. A. Aspness, Montevideo, Minn., and Truman Hibbard, Minneapolis, Minn., by Irving P. Lord, president and principal owner. It is stated that the consideration was about \$100,000. The property includes 5.4 miles of single track, ten cars, a going lighting and power business and three water powers. The transfer to the new owners will be made about Nov. 1, at which time Mr. Lord will retire from the management, where he has served for more than twenty-five years. At the time Mr. Lord took over the property it was practically bankrupt, and at the present time it ranks among the most prosperous plants of its size in Wisconsin. Mr. Aspness, one of the new owners, was formerly secretary and general manager of the Montevideo Light & Power Company, and Mr. Hibbard is secretary and general manager of the Electric Machinery Company, Minneapolis.

**Wichita Falls (Tex.) Traction Company.**—The Wichita Falls Traction Company has filed an amendment to its charter with the Secretary of State at Austin certifying to an increase in its capital from \$700,000 to \$775,000.



DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1½ per cent, preferred.  
Central Illinois Public Service Company, Chicago, Ill., quarterly, 1½ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent.  
Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.  
Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Columbus, Ohio, quarterly, 1½ per cent, preferred.  
Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, second preferred.

International Traction Company, Buffalo, N. Y., quarterly, 1 per cent, 4 per cent cumulative preferred; quarterly, 1¼ per cent, 7 per cent cumulative first preferred; 1 per cent preferred.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¼ per cent, preferred.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred; one-half of 1 per cent on account of the accumulated dividends.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Porto Rico Railways, Ltd., Ponce, Porto Rico, quarterly, 1¼ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 2 per cent.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 2 per cent, preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, 1 per cent.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1¼ per cent, first preferred.

Virginia Railway & Power Company, Richmond, Va., 1½ per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

York (Pa.) Railway, quarterly, 1¼ per cent, preferred.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1¼ per cent, preferred; three-quarters of 1 per cent on account of accumulated preferred dividends.

# Traffic and Transportation

## OHIO ABANDONMENT CASE DECIDED

Public Service Commission Holds That It Is Without Jurisdiction to Prevent Abandonment of Service Following Foreclosure Sale.

The Public Utilities Commission of Ohio has decided that it has no jurisdiction in connection with the application made to it to prevent abandonment of service on the Lake Erie, Bowling Green & Napoleon Railway, and has dismissed the complaint.

On Aug. 13, 1916, O. W. Fisher and others, residents of Wood County, Ohio, filed a complaint before the commission, stating among other things that the Lake Erie, Bowling Green & Napoleon Railway and those claiming the right to operate the line, through Theodore Luce as trustee, threatened to discontinue the operation of the railway and to tear up the track and dismantle the property and sell it as junk. They asked the commission to require those claiming the right to operate the railway to continue the operation and furnish passenger and freight service, and to restrain and enjoin the owners from tearing up the tracks and dismembering the property.

Mr. Luce in his answer stated among other things that the railway was never sufficiently patronized to make the operation of it profitable; that the road was sold by the order of the District Court of the United States for the Northern District of Ohio, Western Division, by a receiver appointed by the court; that he purchased the property; that he discontinued the operation of the said railway and intended to dismantle and sell it as scrap in pursuance of the orders of the court. He denied the jurisdiction of the commission to interfere with him in his purpose to dismantle the road and discontinue service.

In the reply filed by the complainants they denied that the decree of the court gave the purchaser any right to dismantle the property or to remove any part which might affect the general operation of the road, or interfere in any way with the continued running of cars, and also denied his right to suspend operation or to dismantle the road.

Because of the gravity of the situation, the commission took the matter up out of its regular order and granted a speedy hearing. In its finding the commission said in part:

"It is needless to say that, as this is an administrative body, clothed with no power to issue injunctions, the sole and only question to be determined in this proceeding is as to its authority to require the continued operation of the railway.

"On the threshold of the inquiry as to the jurisdiction of this commission in this matter, the question arises, Has a railway the right to abandon its service, surrender its franchise, and go out of business, without first securing from some constituted authority, permission so to do? If it has not the right voluntarily to abandon its service and withdraw from the business in which it was engaged, to what tribunal should it apply for such consent and what showing is it required to make before it is entitled to permission to cease to serve the public and carry on the functions for which it was organized?

"We do not find any power lodged in this commission to determine the question as to whether or not a railroad may entirely abandon its service. It seems to us to be a legal question which must be judicially determined by a court having competent jurisdiction to inquire into the justness and reasonableness of the application, and clothed with the equitable power to grant or withhold its consent as the facts and circumstances would warrant; and if granted, to prescribe the conditions upon which it may withdraw.

"In a recent case reported in Volume C, page 871, 1915, Public Utilities Reports, annotated, the New York commission in discussing the question as to whether or not a railroad which was doing unprofitable business might properly be abandoned said, 'While this is doubtless true as a general statement of the abstract right, it does not follow

## ELECTRIC RAILWAY MONTHLY EARNINGS

### BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '16	\$17,421	\$8,516	\$8,905	\$3,501	\$5,404
1 " " '15	16,016	9,114	6,902	2,169	4,733
12 " " '16	205,216	104,420	100,796	36,264	64,532
12 " " '15	182,229	110,676	71,553	25,322	46,231

### COLUMBUS (GA.) ELECTRIC COMPANY

1m., July, '16	\$70,246	\$28,591	\$41,655	\$28,651	\$13,004
1 " " '15	57,364	25,484	31,880	28,679	3,201
12 " " '16	795,636	335,427	460,209	344,115	116,094
12 " " '15	700,035	319,471	380,564	345,113	35,451

### DALLAS (TEX.) ELECTRIC COMPANY

1m., July, '16	\$144,235	\$93,484	\$50,751	\$36,538	\$16,213
1 " " '15	144,101	94,002	50,099	33,397	16,702
12 " " '16	1,901,270	1,176,633	724,637	427,172	312,664
12 " " '15	1,933,274	1,126,295	806,979	400,819	406,160

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., July, '16	\$72,309	\$38,992	\$33,317	\$8,763	\$24,554
1 " " '15	65,067	34,014	31,053	8,716	22,337
12 " " '16	797,879	418,704	379,175	106,119	273,056
12 " " '15	676,520	383,473	293,047	104,703	188,344

### EL PASO (TEX.) ELECTRIC COMPANY

1m., July, '16	\$76,173	\$74,148	\$2,025	\$4,892	†\$2,867
1 " " '15	77,426	44,006	33,419	4,203	29,216
12 " " '16	1,045,317	567,785	477,532	54,167	423,365
12 " " '15	991,199	536,154	455,045	50,336	404,709

\*Includes taxes. †Deficit. ‡Includes non-operating income.



that a railroad corporation may discontinue its entire service at will and itself be the sole judge of the propriety and necessity of such a discontinuance. It would seem that consent of the State is a prerequisite to the absolute abandonment of the enterprise. We are not called upon to determine how such consent may be obtained; sufficient to say that there is nothing in the Public Service Commission's Law which clothes this commission with authority either to ascertain and decide whether the facts upon which such a right is predicated actually exists in a given case, or to determine the terms and conditions under which the abandonment of such an enterprise may be permitted.'

"If it is necessary, however, for the carrier first to obtain permission from a court of competent jurisdiction before it can withdraw from serving the public, has not that question already been determined in this case by the decree of the court in the foreclosure proceeding in which the purchaser received the right to sell said above described property, or any part thereof; provided, always, however, that any such assignment or sale shall be made for cash and that the proceeds thereof shall be paid forthwith to the special master, and by like expressions in the various decrees of the court which have been herein before quoted?

"Nowhere in a subsequent decree has the court surrendered its jurisdiction of all the questions affecting the disposition of this property; that court still holds the right, until the purchase price is paid, to retake and resell the property. The receiver and the special master are officers of that court, and the purchaser is but selling the property piecemeal and carrying the proceeds into that court which has the whole matter in hand, and is working out the rights of the public, the creditors and the stockholders. It seems to us that it would be presumption on our part to assume to make any order relative to this property while it is being sold for the payment of its debts and under the orders of a court of competent jurisdiction. If we were to assume to have authority, against whom would the order issue? Mr. Luce is in possession, but his title does not ripen until he pays the purchase price and receives the deed of conveyance. If the orders of the court carry with them the right to dismantle this property, and if the complainants feel that such order should not have been made, they have their remedy by appeal. If the orders already made do not amount to the granting of authority to dismantle the property, then any interested party may still apply to that court, and will doubtless grant a hearing upon the application to restrain the dismantling of the property, at least while under its jurisdiction.

"We are informed that since the filing of this complaint an application was made to the Court of Appeals sitting at Sandusky, Ohio, and that it took the view that the exclusive jurisdiction is still in the United States District Court.

"We realize that the withdrawal by a common carrier of its service is a serious loss to a community and if it were possible, would be glad to grant relief, if the facts warranted it; but as we view the matter the question is not within our jurisdiction, and the application will be denied.

"In order that the complainants may have an opportunity of presenting the question to the Supreme Court for review, if they so desire, we have noted their exceptions to the finding of the commission."

#### SAFETY INCREASED IN SAN FRANCISCO

After a tryout for one month of the plan for keeping jitneys off Market Street in San Francisco between the hours of 10.30 a. m. and 4 p. m., there is general approval of the plan, and its advantages are so apparent that there is little doubt of the rule being made permanent. The traffic chief of the police department stated to a representative of the *ELECTRIC RAILWAY JOURNAL* that only two auto accidents were reported on Market Street in the month since the jitneys were ruled off. From six to fifteen accidents had been reported regularly each month for the thoroughfare. Since the jitneys were prevented from operating on Market Street during the middle of the day, the number of buses in service has decreased at the rate of about fourteen a week. An average of twenty cars a week have abandoned the service and six or seven new cars a week have entered the service.

#### TEACHING SAFETY TO SCHOOL CHILDREN

Red for "danger" and green for "Irish" was the conception of the danger and safety emblems which Mrs. Katherine D. Larrabee, the lecturer of the bureau of Public safety of the Brooklyn (N. Y.) Rapid Transit Company, found to be most widely entertained among the children of the Brooklyn vacation schools and playgrounds whom she met in the annual summer school safety campaign under the auspices of the Brooklyn Institution for Safety and the Board of Education. Mrs. Larrabee was well pleased that the children universally recognized the danger sign, and she explained to them the more exact significance of the green symbol from the safety point of view.

During the safety work this summer approximately 100 lectures were given in fifty-five different playgrounds throughout Brooklyn. The school authorities, on account of the epidemic of infantile paralysis, were obliged to restrict very largely the extent of some of the playground activities, and the children were met by the lecturer as a rule in small groups rather than in large bodies of 1000 or more. Games and play stories were introduced with great success. An adaptation of the old "stage coach" game, in which various matters bearing on the question of safety were brought out, was especially introduced.

Safety races for prizes formed another part of the playground work, the winners of the trial heats being tagged by a piece of green paper and the losers by a piece of red paper. The winners of the final heats received prizes, such as a baseball to the older children and a rubber ball to the younger children.

The company's bureau of public safety, at the close of the summer playground work, received a letter from Henry J. Silverman, who acted as supervisor of the work in the vacation schools and playgrounds, to the effect that the principals and teachers in the schools had spoken to him about the interesting way in which the subject of safety had been taken up. He was sure that the work would bear good results. In connection with the summer work Ingersoll watches ("Junior" size to boys, "Midgets" to girls) were awarded to twenty-eight pupils for special merit in the safety work, and "safety always" banners were given to sixteen schools.

#### BAY STATE COMPANY NOT REQUIRED TO EXTEND DISCONNECTED LOCATION

The Public Service Commission of Massachusetts has issued a decision denying that portion of a petition of citizens of Lowell asking that the Bay State Street Railway be compelled to extend its lines from the intersection of Varnum Avenue and Totman Street to the so-called Boulevard entrance at Fowler Road. Chapter 244, Acts of 1916, section 23, gives the board power to order any street railway to build and operate any just and reasonable extension of its lines for which it may have or may be granted locations. The statute imposes upon the commission, however, the duty of examining the circumstances of every case and of considering the effect of any order to be made upon the financial ability of the company to make necessary changes of equal or greater importance. The petition also urged that the company be required to complete a previous location of its lines from the present terminus in Varnum Avenue northward to Totman Street.

The commission states that the present financial condition of the company does not warrant the enforced building of extensions where the prospect of securing sufficient revenue to justify their construction cannot be made to appear. Traffic counts by the parties to the proceedings and by the inspectors of the commission, and other evidence, hold out no promise of such increase in revenue as would indicate that the proposed extension from Varnum Avenue and Totman Street to Fowler Road could, in any reasonable, proximate period, justify its construction. The company's first location, however (from Mammoth Road to Lexington Avenue, in Varnum Avenue), has been partly built upon. This, in the commission's view, gives this part of the line a different status from that of the second location (from Varnum Avenue and Totman Street to Fowler Road), no part of which is regarded as of any value by the company and which the company has indicated its willingness to surrender. It



is the board's view that the action of the company in building upon part of the first location obtained imposed upon the company the obligation of completing the work to the northerly limit of that location. The company is therefore required to complete its line to the intersection of Totman Street and Varnum Avenue, but is permitted to refuse to build the extension to the Boulevard entrance.

#### SEATTLE BUS QUESTION TO GO BEFORE VOTERS

At a special session of the City Council of Seattle, Wash., recently, a resolution was introduced and adopted which has for its purpose the submission to the voters at the general election on Nov. 7 of the entire subject of jitney bus regulation. The bill and resolution were both proposed by Councilman Allen Dale, and seconded by Councilman R. H. Thomson. The bill will come before a committee of the whole Council at an early date. It will provide for the issuance of certificates to motor bus operators by the superintendent of public utilities, who is to be empowered to grant, refuse or modify the route, terminals or schedule of each application for a certificate. It will also provide that changes in routes may not be made oftener than once in thirty days, and that all certificates shall expire on Dec. 31 of each year. The superintendent of public utilities will be authorized to promulgate necessary rules designating places throughout the city for taking on and discharging passengers. Appeals may be made from orders of the superintendent of public utilities to the Board of Public Works, and from the Board of Public Works to the City Council, which is to be the final arbiter. The City Council will be empowered to require the operators of motor passenger vehicles to furnish a bond in sufficient amount and with adequate security on the condition that the operator shall pay all damages which may be sustained by any person injured by reason of any careless, negligent or unlawful act on the part of the operator, his agents, or employees.

**San Francisco May Operate Motor Buses.**—As an auxiliary to the Municipal Railway system, the San Francisco Board of Supervisors recently approved the recommendation of City Engineer O'Shaughnessy, who proposed that motor buses be run across Golden Gate Park between Sunset and Richmond Districts, to connect with the municipal cars. No decision has been made as to just what routes will be followed, but the Board of Public Works has been directed to prepare and submit for approval of the Supervisors, specifications for furnishing the city with auto buses suitable for transporting passengers.

**Accident in New York Subway.**—In a rear end collision on the subway division of the Interborough Rapid Transit Company, New York, N. Y., on Sept. 25, a patrolman on strike duty was seriously injured and a dozen passengers were slightly hurt. The motorman of the follower, the moving train, jumped to safety. He has been in the employ of the company for ten years and Frank Hedley, vice-president and general manager of the company, declared that the extreme nervous tension to which motormen have been subjected because of the strike was directly responsible for the collision. Each of the ten-car trains involved was made up entirely of steel cars.

**Commission Decision Rendered in Pittsburgh "Owl" Fare Case.**—In an opinion handed down on Sept. 28 the Public Service Commission of Pennsylvania holds that the Pittsburgh Railways acted in violation of both the spirit and the letter of the public service company law of the State in the way in which it proceeded to give notice of the doubling of its "owl" car or night fares, and in an order supplementary to the opinion the commission directs the company to cease from collecting any rates or enforcing any rules or regulations except those contained in its original tariff filed on July 17, 1914, and further orders the company to make reparation to its patrons for excess fares upon presentation of certificates of excess payment issued under order of the commission since June 23.

**Plea Made for Omaha Jitneys.**—John N. Baldwin, attorney for the Jitney Drivers' Association, declares Omaha's twenty-five jitneys will be driven off the streets on Oct. 1, unless the ordinance relating to liability bonds is made less

oppressive. The ordinance requires bonds rendering the insurance company "primarily liable" for damages in the event of accident. This and other clauses are practically prohibitive, according to Mr. Baldwin. The only company which has been bonding jitneys has given notice that no more bonds of the kind now in use will be provided. The jitneys' license will expire on Oct. 1. Mr. Baldwin says that as they cannot secure new bonds unless the ordinance is amended they will be driven off the streets.

**Organizing for Kansas City Safety Work.**—W. H. Cameron, secretary, and C. W. Price, field secretary, of the National Safety Council, spent Sept. 18 and 19, in Kansas City assisting the newly organized local council in planning its work. The extensive organization of the Kansas City Railways provided useful groundwork for the local council, and at each of the conferences many heads of departments of the railways were present. J. H. Harvey, superintendent of efficiency of the railway, and head of its safety movement, presided at all sessions. These conferences emphasized the value of educating the children. This phase of the work, perhaps the most important, will be prosecuted largely through the machinery already put into motion by the company for reaching the school children.

**Buffalo Fare Reduction Case Adjourned.**—Apparently not in sympathy with the suggestion made by the Corporation Counsel to start proceedings for a reduction from 5 to 4 cents in the fare charged by the International Railway, Buffalo, N. Y., over its city lines, the City Council adjourned the matter when it came up for a hearing. Porter Norton, counsel for the company, appeared before the city authorities and branded any attempt on the part of the city to force a rate investigation by the Public Service Commission as a reprisal to thwart the company's efforts to have its special franchise assessment reduced. Mayor L. P. Fuhrmann asked the Corporation Counsel why he desired to connect the proceedings to have the company's property appraised and the proposed rate investigation and he replied that the same evidence could be used in both matters. At the company's request the hearing was adjourned.

**Division of Ferry and Bridge Fare to Stand.**—Members of the Seattle Port Commission and taxpayers residing in the eastern and western districts of Seattle at a special meeting of the commission rejected the plan proposed by C. E. Remsberg, its secretary, for giving the Ferry Line Auto Bus Company 3 cents of every 5 cents paid aboard the bay ferry steamboat at West Seattle, whether or not the passengers use the bus line. Under the present arrangement with the Ferry Auto Bus Company, the taxpayers, according to reports, are losing \$1,200 a month. This sum would be increased to about \$1,800 a month were Commissioner Remsberg's plan placed in effect. The Port Commission's budget for 1917 shows a deficit of \$24,000 for the operation of the West Seattle ferry, according to Charles Cowen, representing property owners in the Cowen Park District. On motion of Commissioner Robert Bridges the commission decided to continue the present plan of dividing the fares of only those passengers who use both the ferry and the autobus line. This line operates from the West Seattle Ferry, in West Seattle, throughout that district.

**Prospective Improvement in Long Beach (Cal.) Traffic Conditions.**—Officials of the Pacific Electric Railway, Los Angeles, Cal., have recently been in conference with the Long Beach Safety Commission, with the result that a program has been agreed upon by both parties which embraces much needed changes in the traffic conditions. James R. Williams, Safety Commissioner, plans to submit the agreement, which has been jointly compiled, before the city authorities, and it is anticipated that it will carry considerable weight because of the joint sanction of the Safety Commission and the Pacific Electric Railway. The principal features of the new program are as follows: Passage of a new ordinance prohibiting jitneys from operating on streets where car lines are in operation; removing the jitney terminal from the congested district, corner of First Street and Pine Avenue, to the corner of Ocean and Pacific Avenues; possible placing of the jitneys on a franchise basis, and a ten-minute service on all lines of both jitneys and street cars between the hours of 6 a. m. and 10 p. m., and half hourly from 10 p. m. to midnight.



## Personal Mention

**H. B. Whiteman**, who has been acting as assistant secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., has been appointed secretary and treasurer of the company to succeed H. C. Walters, resigned, who has entered the newspaper business.

**A. E. Rhoades**, inspector for the Transcontinental Freight Bureau in Sacramento, Cal., has been appointed general freight and passenger agent of the Central California Traction Company, Sacramento, Cal., to succeed W. P. Neville, whose resignation from the company is announced elsewhere in this column.

**H. C. Walters**, whose resignation as secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., was announced in the *ELECTRIC RAILWAY JOURNAL* for Sept. 23, entered the railway field in 1900 with the company. He started in at the very bottom and worked himself up to the place of secretary and treasurer, which position he filled for the past eight or nine years.

**Charles B. Hole**, Montclair, N. J., has succeeded Bird S. Coler, New York, N. Y., as president of the North Carolina Public Service Company, whose properties include street railways and electric light and gas plants, etc., at Greensboro, High Point, Salisbury, Spencer and Concord, N. C. Mr. Coler will continue with the company as a member of the board of directors. Mr. Hole will reside at Greensboro.

**W. P. Neville** has resigned as general freight and passenger agent of the Central California Traction Company, Sacramento, Cal., to become manager of the Lawrence Warehouse Company. Mr. Neville has been with the Central California Traction Company since it was organized seven years ago. He started as freight clerk and was promoted to chief clerk, then to agent and finally to general freight and passenger agent.

**D. C. Green**, formerly connected with the organization of H. M. Bylesby & Company as local manager at two Oregon and Washington properties, has been appointed general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark., succeeding H. C. Hoagland, who has been managing that property in connection with his work as manager of the Muskogee Gas & Electric Company for some time past. Mr. Hoagland will continue as manager of the Muskogee Gas & Electric Company.

**Alfred F. Townsend** has been appointed manager of the Stone & Webster properties at Beaumont and Port Arthur, Tex., included in the system of the Eastern Texas Electric Company. Mr. Townsend has been associated with the Stone & Webster interests for the last fifteen years, during which time he has been connected with the Lowell (Mass.) Electric Light Corporation; Ponce (Porto Rico) Railway & Light Company; Sydney (Nova Scotia) & Glace Bay Railway and the Woonsocket (R. I.) Electric Machine & Power Company.

**E. E. Hawkins** has resigned as president of the Ogdensburg (N. Y.) Street Railway, the Ogdensburg Power & Light Company and the Ogdensburg Gas Company, and will remove to Patchogue, L. I., and devote his entire time to the Patchogue Electric Light Company, of which he is president. Mr. Hawkins has been engaged in public utility work for many years, and besides the connections just mentioned was formerly with the Patchogue & Port Jefferson Traction Company and the New Paltz & Walkill Valley Electric Railway, New Paltz, N. Y.

**Harry D. Frueauff**, retiring general manager of the City Light & Traction Company, Sedalia, Mo., was the guest of honor on Sept. 8 at a banquet tendered him at Hotel Terry, Sedalia, by the company employees and a few invited guests as a farewell previous to his departure for Montgomery, Ala., where he is to be general manager of the Montgomery Light & Water Power Company as noted previously in the *ELECTRIC RAILWAY JOURNAL*. In appreciation of the good fellowship that Mr. Frueauff has instilled

among all officials and company employees during the three years' service at Sedalia the employees and other company representatives presented him with a valuable Elk charm.

**Sam W. Greenland** has been elected president of the Indiana Electric Light Association. Mr. Greenland was born at Clarion, Pa., in 1879. He was educated at the Pennsylvania Military College at Chester, Pa., and at the Pennsylvania State College, State College, Pa. At the latter institution he was graduated in electrical engineering. Since that time he had been employed in the construction department of the American Telephone & Telegraph Company in the Pittsburgh district in gas, electric and electric railway engineering with Robert W. Watson, consulting engineer, Harrisburg, Pa., and in central-station operating work. In the latter pursuit Mr. Greenland was first general manager of the Columbus Railway, Light & Power Company, Columbus, Miss. Later he took up the position he now holds, that of general manager of the Fort Wayne & Northern Indiana Traction Company. This company operates 220 miles of electric street and interurban railway in the vicinity of Fort Wayne, as well as electric light and power properties at Fort Wayne and at thirteen other interconnected Indiana towns.

**Irving P. Lord**, president and general manager of the Waupaca Electric Light & Railway Company, Waupaca, Wis., and principal owner of the company, has sold his interest in the property and will retire from the management to engage in law practice. Mr. Lord was born in Waupaca in October, 1857, and by teaching school and newspaper reporting he obtained funds to attend Lawrence University at Appleton, Wis. Subsequently he studied law and was admitted to the bar in 1881. In 1888 Alexander Dow of the Brush Electric Company, Cleveland, Ohio, and others, incorporated the Waupaca Electric Light Company and Mr. Lord became one of the stockholders. In 1892 Mr. Lord and W. D. Baker acquired the property and reincorporated it under the name of the Waupaca Electric Light & Railway Company, at which time Mr. Lord was made president. Mr. Lord was one of the charter members of the Northwestern Electric Association, which later was superseded by the Wisconsin Electrical Association, and served as president of the Northwestern association for a year. In January, 1912, he was elected president of the Wisconsin Electrical Association. The company at Waupaca operates 5.4 miles of line and ten cars. It furnishes energy for lighting and power in addition to that for railway operation.

**W. B. Voth**, who resigned recently as chief engineer and purchasing agent of the Empire United Railways, Inc., Syracuse, N. Y., has been appointed general manager of



W. B. VOTH

the Ogdensburg (N. Y.) Street Railway, the Ogdensburg Power & Light Company and the Ogdensburg Gas Company, and entered upon his duties with these companies on Sept. 25. Mr. Voth was connected with the Empire United Railways for two years. Before that he was general superintendent of the electric railway and lighting property at Sheboygan, Wis. Mr. Voth is a native of Milwaukee, and was graduated from the University of Wisconsin in 1897. After designing, constructing and operating several small hydroelectric

plants in his native State, he was appointed resident engineer at Sheboygan in 1904 during the building of a steam power station and the reconstruction of the local commercial and street lighting system. After finishing the construction work Mr. Voth remained to operate the plant as general superintendent. At the same time he acted as consulting engineer for the Greensboro (N. C.) Company, controlled by the same interests, resigning, however, in 1914, to become chief engineer and purchasing agent of the Empire United Railways.



H. Bertram Potter has been appointed assistant to the president of the Boston (Mass.) Elevated Railway. This office in the company's scheme of organization is intended to supply President Brush

with a personal representative who shall be authorized to represent and act for him in all matters. Mr. Potter is thirty-five years of age and has been in electric railway work eleven years. He was educated in the public schools at Cambridge, Mass. When he was sixteen years of age Mr. Potter entered the industrial field in a machine shop at South Boston. His business experience was broadened by a term of service as receiving teller in the then American National Bank, Boston, and by a period of traveling salesmanship for a clothing establishment. Through his banking acquaintance, Mr. Potter was selected in 1905 to go to Lewiston, Me., to take charge of the building of the Lewiston & Turner Street Railway, now a part of the Lewiston, Augusta & Waterville Street Railway system. In the construction and operation of this road, which included about 14 miles of track, Mr. Potter as general manager obtained valuable experience along many lines and developed the first purely electric freight business in New England, as distinguished from the usual ramified express service. Upon the purchase of the road by the Clark interests of Philadelphia he began work for the Lewiston, Augusta & Waterville property, only to be called immediately to the Boston Elevated Railway to develop the electric freight business of the latter. This branch of the company's service has been brought to a high stage of efficiency through agreements with other operating companies which handle the business, the Boston Elevated furnishing certain transportation and terminal facilities within its territory without the handicap of caring for usual detail. When the present chief executive of the company joined the Boston Elevated Railway about six years ago as assistant to the vice-president, Mr. Potter became Mr. Brush's assistant, and has held that post at each successive advance of his superior. His work has been closely identified with the bureau of transportation and during the last three years he has had charge of the company's interests before the Massachusetts Public Service Commission and other public and quasi-public boards and organizations. Mr. Potter's work at public hearings has won him the confidence of the commission and the public alike, and his willingness to meet opponents frankly and squarely with clear and friendly explanations of the company's position has accomplished much in the establishment and in the maintenance of the best public relations. He is a member of the American Electric Railway Transportation & Traffic Association, the New England Street Railway Club, Masons, Elks, Boston Chamber of Commerce and many local organizations.

#### OBITUARY

James A. Leslie, brief mention of whose death was made in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2, spent his life in the street railway business. He was born on Nov. 16, 1865, and entered the employ of the old Southern Railroad, St. Louis, as a street car driver. He remained on the front platform until the line was converted into electric, when he became a conductor on the Lindell Railway. There he remained a little over a year, when he returned to the Southern Electric as a road officer. After nine years as a road officer he resigned to retire to private business. In March, 1901, he returned to railway work, entering the service of the United Railways in the fifth division as an instructor of motormen. At this time the Olive line had just been changed from cable to electric power. Shortly afterward he was promoted to be division road officer on Broadway, and then came his promotion to superintendent of the division.



H. B. POTTER

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

#### RECENT INCORPORATIONS

\***McDonald & Burgettstown Street Railway, Pittsburgh, Pa.**—Incorporated to construct and operate a 15-mile electric railway in Washington County. Capital stock, \$100,000. Incorporators: R. L. Henderson, Pittsburgh, and others.

#### FRANCHISES

**Riverside, Cal.**—The Pacific Electric Railway has received a franchise from the Council to relocate its tracks to the center line of Fourteenth Street between Main Street and a point east of Almond Street.

**Lawrence, Kan.**—The franchise granted by the city of Lawrence to the Kansas City, Kaw Valley & Western Railway has been refused by the company, owing to restrictions on the hauling of freight through Lawrence and the clause allowing the city to change the franchise whenever it wished. The interurban lines from Kansas City to Lawrence are now operating within the city limits under a temporary agreement.

\***St. Louis, Mo.**—The J. C. C. Waldeck Electric Railway has asked the Board of Public Utilities for permission to construct an electric railway over Montrose Avenue from the Missouri Pacific Railway tracks to the plant of the Independent Packing Company at Hickory Street and Ewing Avenue.

**Buffalo, N. Y.**—The City Council has approved the application of the International Railway for a franchise to lay double tracks and operate cars  $\frac{1}{2}$  mile through Franklin Street from Chippewa to Allen Street. Under the charter the franchise must be approved by voters at a general election before it can be effective.

\***Portage, Pa.**—Application has been made to the Borough Council for a franchise to construct an electric railway between Portage and Martindale. J. I. Johnson, Johnstown, Pa., is interested.

**Parkersburg, W. Va.**—The Kanawha Traction & Electric Company has asked the Council of Parkersburg for a thirty-year extension of its franchise.

#### TRACK AND ROADWAY

\***Grass Valley, Cal.**—Plans are being made for the construction of a 1-mile electric line to connect the Empire and Pennsylvania mines, owned by W. B. Bourn, San Francisco.

**Martinez & Concord Interurban Railway, Martinez, Cal.**—Work will be begun on the construction of the Martinez & Concord Interurban Railway within the next few weeks. Grading will be begun on Escobar, Pine and Jones Streets and the Pacheco Road. Clifford McClellan, San Francisco, is interested. [Aug. 5, '16.]

**Marysville, Cal.**—It is reported that the Los Verjels Land & Water Company plans to construct an electric line from Bangor to connect with the Northern Electric Railway at Oroville.

**Municipal Railway of San Francisco, San Francisco, Cal.**—The public utilities committee of the Board of Supervisors will shortly take up the question of building an extension to the municipal street railway down Baker Street to the Palace of Fine Arts and the proposed new State Normal School in the California Building.

**Georgia Railway & Power Company, Atlanta, Ga.**—This company is double-tracking its Lakewood line from the Jonesboro Road in Lakewood Heights to the Southeastern Fair Grounds, about  $1\frac{1}{2}$  miles.

**Quincy (Ill.) Railway Company.**—This company will build a loop at Twenty-second and State Streets this fall.



**Columbus, Greensburg & Richmond Railway, Columbus, Ind.**—A business survey of this company's proposed line to connect Columbus and Richmond, Ind., has been made by Otto Rensch and John A. Schaffer, Indianapolis, and C. C. Clinton, Chicago. They contemplate financing the road. Frank McColloe and Albert Holland, Columbus, are local promoters. [Sept. 9, '16.]

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.**—This company has been directed by the Board of Public Works, following its own request, to maintain double tracks in South Meridian Street from Palmer Street to the tracks of the Indianapolis Union Railway Company. The company expects to do a large amount of repair and rehabilitation work before winter. Among the more important projects under way are the laying of new track and of paving between the tracks in Cornell Avenue from Twenty-seventh Street to Thirtieth Street, this work being now practically completed. Rails have arrived for completing the new tracks in Fairfield Avenue from Thirty-fourth Street to Woodland Avenue. The company expects to complete new tracks in East Michigan Street from Rural Street to Michigan Drive and is now engaged in laying new rails for the West track in West Street from Washington Street to New York Street.

**Skowhegan & Athens Electric Railroad, Athens, Me.**—President Morris McDonald and Directors George Macomber and Weston Lewis of the Maine Central Railroad, accompanied by Harvey D. Eaton, of Waterville, recently viewed the country over the route of the proposed Skowhegan & Athens Electric Railroad and afterwards told a delegation of citizens that they were highly in favor of the construction of the new road and were willing to make a good traffic contract with the promoters of the proposition. To date the proposition lacks about \$8,000 to complete the pledges of \$100,000, the sum necessary before it can be bonded and the construction work started. [June 26, '15.]

**United Railways & Electric Company, Baltimore, Md.**—This company proposes to construct an extension on Liberty Heights Avenue and the old Liberty road to Villa Nova.

**Twin City Rapid Transit Company, Minneapolis, Minn.**—Work has been begun by this company on the extension of its Franklin Avenue line from Twenty-seventh Avenue to Seabury Avenue south. This extension will bring the line to the western end of the Franklin Avenue bridge and ultimately the track may be extended across that structure to a connection with the Rondo line of St. Paul.

**Kansas City (Mo.) Railways.**—A contract has been awarded by the Kansas City Railways for the construction of four miles of extensions in Kansas City, to Littlefield, Fry & McGough, Chicago, at an estimated cost of about \$220,000. The work is in five sections.

**New York Municipal Railway, Brooklyn, N. Y.**—The Public Service Commission for the First District of New York has awarded to the Degnon Contracting Company, New York City, a contract at \$810,265, for the construction of Section 1-B of Route No. 12, a part of the Fourth Avenue Rapid Transit Railroad. The section in question lies in part underneath the Atlantic Avenue station of the Long Island Railroad in Brooklyn. It is part of the Brighton Beach Connection between the Brighton Beach Railroad and the Fourth Avenue Subway. A contract was also awarded by the commission for the installation of tracks on the main portion of the Culver Rapid Transit Railroad in Brooklyn to Kaufman & Garcey, New York City, at \$103,680. The new Culver line now under construction is an elevated railroad and will replace the present surface extension of the Fifth Avenue Elevated line extending to Coney Island, and known as the Culver Line. The new line will become an extension of the Fourth Avenue system. The contract awarded to Kaufman & Garcey covers track installation over practically nine-tenths of the line. The portion of the line from near Avenue X to the Coney Island Terminal will be constructed later. It is expected that the line will be completed and ready for operation some time next year.

**Charlotte (N. C.) Electric Railway.**—This company is building a 1½-mile extension in Dilworth.

**Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.**—It is reported that during the coming year this company will construct an extension to Hudson.

**Hamilton, Ont.**—The City Council of Hamilton, at a special meeting on Sept. 19 approved the proposal to construct a hydroelectric railway line from Port Credit to St. Catharines, via Hamilton.

**Toronto (Ont.) Suburban Railway.**—This company plans to construct an extension of its line from Bathurst Street east along Davenport Road and down Poplar Plains Road.

**Southern Pacific Company, Portland, Ore.**—Work will soon be completed by this company on the installation of a new safety device on its Oswego-Portland line. The system over this stretch of track will have seventeen signal lights and sixteen foundations, two for relay purposes. There will be a signal on each side of every curve between Oswego and Jefferson Street station. The company has spent considerable money in the reinforcement of its trestles by means of concrete pedestals and general overhauling of the roadbed. The total cost of improvements is estimated at \$40,000.

**Southern Pennsylvania Traction Company, Chester, Pa.**—Joint installation of a new pole line in the business district of Chester will be made by the Southern Pennsylvania Traction Company and the Beacon Light Company. The poles will be iron of ornamental design.

**Hershey, Pa.**—Preliminary surveys have been completed of the proposed line between Manheim and Hershey. It is planned to connect with the Elizabethtown line of the Hershey Transit Company. It is reported that the Hershey Transit Company will supervise the construction of the line. [June 17, '16.]

**Irwin-Herminie Traction Company, Irwin, Pa.**—An application will be made before the Public Service Commission of Pennsylvania on Oct. 3 for an extension of the Irwin-Herminie Traction Company's line north to Export.

**Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.**—Grading has been practically completed between Womelsdorf and Newmanstown by the Lebanon Valley Construction Company for the proposed line of the Womelsdorf, Richland & Myerstown Street Railway. It is expected that the line will be placed in operation before winter. The road will be completed to Myerstown early next summer. Leroy R. Valentine, Womelsdorf, president. [Sept. 2, '16.]

**Canadian Pacific Railway, Montreal, Que.**—It is reported that this company contemplates the electrification of its line between Kingston and Renfrew. It is stated that a power plant will be installed on the Mississippi River back of Sharbot Lake to develop power for the project as well as to supply current to Kingston and vicinity.

**Chattanooga Railway & Light Company, Chattanooga, Tenn.**—The East Chattanooga Chamber of Commerce has revived a movement instituted several years ago, seeking to have the construction of a street car line on Oak Street south and Ocoee Street. The Chattanooga Railway & Light Company will be petitioned to make the extension.

**Nashville & Gallatin Interurban Railway, Nashville, Tenn.**—Extension of this company's line from Edenwold to Springfield, Tenn., 19 miles, is expected to be undertaken shortly. Whether the line will be extended from Springfield to Adairville, Ky., 10 miles further, will depend on a survey of conditions now being made to show the probable traffic on such a line. Stockholders of the Nashville-Gallatin Interurban Railway have approved the extension to Springfield, for which Springfield will raise \$150,000, to which \$50,000 would be added in case of an extension to Adairville.

**Dallas (Tex.) Electric Company.**—A new street car line, about a mile long, extending from the vicinity of Fair Park to Parkview, a new addition to the city of Dallas, has just been placed in operation by this company.

**Northern Texas Traction Company, Fort Worth, Tex.**—With the nearing of completion of the new paving on Main Street from the Courthouse to the Union Station, Mayor Tyra has served notice on G. H. Clifford, general manager of the Northern Texas Traction Company's lines, that the company must complete its line on Commerce Street and redistribute its traffic over Commerce, Main, Houston and Throckmorton Streets, instead of operating all cars over Main and Houston Streets as at present.



**Petersburg & Appomattox Electric Railway, Petersburg, Va.**—It is reported that work has been begun by the Vaughan Construction Company of Roanoke on this company's proposed extension between Hopewell and City Point, 2½ miles.

**Grays Harbor Railway & Light Company, Aberdeen, Wash.**—The City Commission has instructed the Grays Harbor Railway & Light Company that unless it paves between the rails of its right-of-way on Riverside Avenue within thirty days it must surrender its franchise to operate its electric cars in Hoquiam.

**Tacoma Railway & Power Company, Tacoma, Wash.**—Officials of Tacoma Railway & Power Company report cars of the company will be operating on Pacific Avenue, as far as Forty-eighth Street, about Nov. 1. Work on the extension of the Pacific Avenue line began recently.

#### SHOPS AND BUILDINGS

**Ware & Brookfield Street Railway, Ware, Mass.**—Work has been begun by the Ware & Brookfield Street Railway on the construction of a new brick carhouse. The structure will be 125 ft. deep by 75 ft. wide and will be near the site of the old carhouse.

**Detroit (Mich.) United Railway.**—Work is now under way by the Detroit United Railway on the construction of a new office building and carhouse at West Jefferson Avenue and Mecca Street to replace the carhouse located at Fort Street and Clark Avenue. The carhouse will be 209 ft. x 116 ft., of brick construction, and will contain a boiler room, compressor room, employees' wash and locker room and a stock room. The office building will be 64 ft. x 70 ft., of pressed brick construction. The lower floor will contain offices for the line superintendent, carhouse foreman and cashier, an assembly room for motormen and conductors and a restaurant for employees. The second floor will be used for a locker room and dormitory for night crews. The construction cost is estimated at about \$65,000.

**New York Municipal Railway, Brooklyn, N. Y.**—The Public Service Commission for the First District of New York has awarded to the Serber-Stander Company, New York City, the contract for the construction of station finish on three stations of the Broadway-Fourth Avenue Subway in Manhattan, namely, those at Canal Street, Twenty-third Street and Twenty-eighth Street on Broadway. The amount of the contract awarded was \$149,325.

**Tarrant County Traction Company, Fort Worth, Tex.**—A contract has been awarded to H. D. McCoy, Cleburne, for remodeling the old Raymond Hotel property into a station for the Tarrant County Traction Company. The company expects to occupy the new station by Oct. 15.

**Tacoma Railway & Power Company, Tacoma, Wash.**—Work will be begun immediately by this company repairing its carhouse at South Thirteenth and A Streets. The cost is estimated at \$6,000.

#### POWER HOUSES AND SUBSTATIONS

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—This company will erect a high-tension transmission line from Iowa City to Iowa Junction.

**Des Moines (Iowa) City Railway.**—A contract has been awarded by the Des Moines City Railway to A. H. Neumann & Company, Des Moines, for the construction of an addition to the company's power plant on the Des Moines River. The addition will cost about \$55,000.

**Ohio Service Company, Cambridge, Ohio.**—Work is nearly completed on this company's power plant at Coshocton. A 5000-kw. turbo-generator and auxiliary equipment will be installed.

**Montreal (Que.) Tramways.**—It is reported that work has been begun by this company on the construction of an extension to its St. Denis power station. The cost is estimated at \$20,000.

**Pacific Northwest Traction Company, Seattle, Wash.**—This company contemplates the immediate extension of its electric transmission lines to the district south of Conway. Plans have been prepared for the installation of a power-station at Conway. The cost of the line to Conway is estimated at \$15,000.

## Manufactures and Supplies

#### MOTOR AND CONTROL INQUIRIES INCREASING

**Largest Buying in Eastern States—Orders Comparatively Small—Deliveries and Prices Warrant Prompt Consideration of 1917 Requirements**

Inquiries for railway motors and control are reported as fairly active for this season of the year. During July and the first of August the inquiries were slow, but since that time the market has picked up noticeably and inquiries are out for quite a number of medium sized orders. Usually, just before convention time, inquiries are scarce and sales in motors and railway motor control are comparatively few. Now, however, there are inquiries for more than 150 quadruple equipments.

It is interesting to note that for a number of years there were spring and fall peaks in the buying of railway motors and control. In 1907, however, the Chicago Surface Lines, then just starting their three-year rehabilitation period, made some very large purchases of equipment in the middle of the summer. That year seemed to be the turning point, and since then orders for railway motor and control equipment have been more evenly spread over the year. This balancing of the placing of motor orders also may be due to the quite general abandonment of the old practice of shifting motors between winter to summer car bodies.

During the past two months there have been very few large railway motor or control orders, except that recently placed by the Boston Elevated Railway. This company purchased from the General Electric Company 100 four-motor equipments and forty two-motor equipments and pneumatic train control for all equipments. The Boston order is said to have amounted to about \$500,000.

Referring to the general trade situation for railway motors and control, it is found that most of the activity lately has been, and now is, in the Eastern States. The Interborough at New York and some other large properties placed comparatively large orders earlier in the year.

There are practically no large inquiries on hand from roads in the Central States. In the spring the properties at Kansas City, Detroit, Milwaukee and Minneapolis placed orders for railway motors, which no doubt accounts for the scarcity at this time of large Western inquiries. But it should be noted that the size of the orders just referred to did not favorably compare in the aggregate with those placed by the same companies in former years. Neither was the total large when one remembers that comparatively few motors were ordered in 1915. The 1916 motor orders from the smaller roads in the Central States also are small, if compared with the orders of 1912 and 1913, notwithstanding the fact that many small roads ordered almost no motors during 1915.

The activity in the East during the summer as contrasted with the apparent inactivity in the Central States, may be ascribed to the lag in the return of normal business in the agricultural districts and the consequent lateness in the arrival of good street and interurban traffic in the Central States. Only a few roads in the Central States have yet been forced to increase their equipment to handle the growth of business.

Or, looking at the situation from the purchasing standpoint, it may be that inquiries have been withheld during the summer because of the belief that prices would be reduced before long. Prices now are high as compared with previous years, but in other divisions of the electrical industry, such as in the turbo-generator division, there have been recent price increases, while for motors and control the prices have remained constant since the first of August. Because of the dearth of raw material and because of the labor situation, the manufacturers state that they can offer no hope for any reduction in prices. This, of course, is a situation which now confronts only those roads which are in actual need of additional equipment for extension of service or for replacing obsolete equipment.

But the increase in business that many of the smaller and



most of the larger roads are enjoying will shortly make the purchase of motors and control, as well as cars, a live topic for all roads. The result will be an increased volume of business and consequently the question of delivery will become most important.

Deliveries now on the popular types and sizes of railway motors are quoted at about six months. Eight months is quoted on specials. The delivery of motors and control is almost wholly contingent upon the deliveries to the manufacturer of the raw materials necessary for the construction of the equipment. Copper deliveries are now about five and one-half months, and the motor manufacturers are making heroic efforts to meet even the present comparatively small demands for railway equipment.

Many of those roads which are showing traffic increases are actively considering their future motor equipment needs. Forehandedness in ordering for next year's requirements may beget ample returns. It will certainly result in better delivery than otherwise would be obtainable. This will be true particularly for the smaller orders. Small lot motor orders must take their place in the line of travel through a manufacturer's plant. Exception, of course, can sometimes be made, but rush deliveries are now impossible, and the motor manufacturers, with practically no reserve stocks of parts and raw materials, have to make every order from the ground up, and so are forced to handle their orders on schedule and on the basis of the raw materials available. Thus those roads which will need new equipment during 1917 are crystallizing their requirements into inquiries, as evidenced by the recent activity earlier mentioned.

#### LARGEST COPPER ORDER PLACED

On Sept. 23, the copper producers closed at New York an order for 448,000,000 lb. of copper to be delivered during the first half of 1917. This large order is for export, and the price has not been made public, but the total order is said to amount to about \$125,000,000. During the present week there have been no very large inquiries but prices are firm and indications are said to point to increased prices during October. Copper manufacturers are operating at top notch capacity yet none can make prompt deliveries. The demand for bare and insulated wire is in excess of the enlarged output of the wire manufacturers. This condition indicates the need for forehandedness in making specifications and considering purchases for any railway work to be done next year. The manufacturers are not in position to quote on orders for more than ninety days in advance and deliveries cannot be expected under four or five months. The reasons for restricting quotations to ninety days are: unstable prices for bulk copper, copper for manufacturing cannot be delivered before March, 1917; and the manufacturers cannot afford to tie up their facilities for long in advance.

The enormous size of the foreign order is realized when it is known that the total copper purchased for electrifying 440 miles of the Chicago, Milwaukee & St. Paul Railway was about 8,000,000 lb. as compared with this foreign order for 448,000,000 lb.

#### BIG TIE CONTRACT

The biggest contract for ties in the history of the Southern lumber industry is announced by the National Lumber Manufacturers Association, which states that a railroad tie contract amounting to several million ties a year for a long term of years, has been placed by a group of Eastern railroads with the Kirby Lumber Company of Houston, Tex. In order to facilitate the handling of this contract the Kirby Company has opened branch offices in New Orleans, Mobile and Hattiesburg. The ties will be produced in Louisiana, Texas, Mississippi and Alabama.

#### ROLLING STOCK

St. Petersburg & Gulf Railway, St. Petersburg, Fla., is reported to be in the market for four cars.

Ohio Electric Railway, Springfield, Ohio, has purchased ten trail freight cars, 38 ft. 6 in. over all from the Cincinnati Car Company.

City Railway, Dayton, Ohio, has purchased from the Cincinnati Car Company ten light-weight, double-truck, all-steel

cars, 43 ft. 5½ in. over all, to seat forty-eight passengers. These cars are exact duplicates of the all-steel cars placed in service several years ago with the exception that there is one additional window in the car body.

West Penn Traction Company, Pittsburgh, Pa., has ordered one 45-ft. baggage express car from the Cincinnati Car Company.

Fort Wayne & Decatur Traction Company, Fort Wayne, Ind., has purchased from the Cincinnati Car Company one 40-ft. baggage express car.

Citizens Railway, Clarksville, Tenn., is considering the purchase of two or three single or double-truck closed cars, with or without trucks, with a seating capacity of from twenty-five to forty.

San Francisco-Oakland Terminal Railways, Oakland, Cal., is planning to order twelve new cars for use on the Key Division. It is reported that they probably will be ordered from the American Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., noted in the *ELECTRIC RAILWAY JOURNAL* of July 29 as being in the market for twenty-five cars has ordered twenty-five all-steel, single-end, double-truck motor cars from the Cincinnati Car Company. These cars are to be low-floor, monitor deck, mounted on 24 in. wheels, will seat fifty-two passengers and will weigh about 29,000 lb. completely equipped.

#### TRADE NOTES

General Electric Company, Schenectady, N. Y., has received an order from the Public Service Railway, Newark, N. J., for fifty four-motor equipments, GE 200 type, with new PC control, and fifty air-brake equipments.

McKeen Motor Car Company, Omaha, Neb., has recently shipped to the Ferrocarriles del Norte de Cuba, a type "C" engine, 200 hp. motor car. The length over all is 72 ft. 9¾ in.; width over all, 10 ft. 2¾ in.; total seating capacity, eighty. The length of the first class passenger compartment is 14 ft. 4¾ in. and seats twenty people. The third class passenger compartment is 32 ft. 5¾ in. long and seats sixty people. The length of the baggage compartment is 8 ft. 6 in. and the mail compartment 2 ft. 6 in. The total weight is 74,000 lb. This is the 148th motor car turned out by this company, and upon arrival at its destination will go into service in place of the present steam passenger service between Jucaro and Moron. The car is electrically lighted by the Stone axle system.

John L. Fay, formerly superintendent of electrical distribution for the Union Electric Light & Power Company, St. Louis, Mo., has become associated with the Paducah Pole & Timber Company and the Southern Pine Manufacturing Company as sales manager. Mr. Fay was president of the company section, National Electric Light Association, and was actively engaged in company activities. He was chairman of the executive committee and a director of the Employees' Mutual Benefit Association, a director of the Utility Employees Savings & Loan Association, and chairman of the Central Safety Committee. Mr. Fay was also a member of the Engineers Club of St. Louis, the American Institute of Electrical Engineers, the St. Louis Jovian League of Electrical Interests, the committee on rules and regulations governing construction and maintenance of poles, wires, cables, etc., for the Missouri Association of Public Utilities; and a member of the committee on overhead lines and inductive interferences for 1916-1917 of the National Electric Light Association.

#### ADVERTISING LITERATURE

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued Bulletin No. 48,707, which describes and illustrates direct-current motors and controllers for job presses, folders and bookbinding machinery.

Lord Manufacturing Company, New York, N. Y., has issued the "Lord Hand Book" describing hand brakes for all types of equipment. This book will be of considerable value to engineers and railway master mechanics, as it shows by diagram the various methods of installing brake rigging and computing brake pressures.





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**John A. Roebling's Sons Company**  
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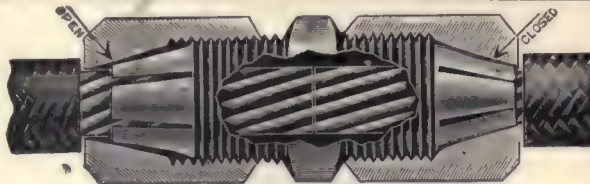
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Your cable joints will be the strongest points in your feeders if you use

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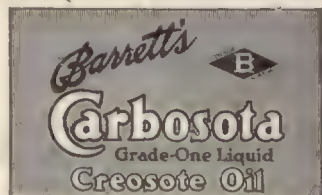
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No Interlocking Switches Are Safe Without  
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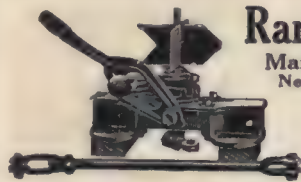
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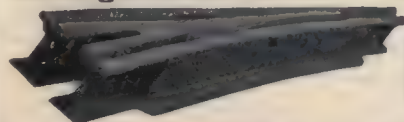


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TO THE  
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An extra powerful and handy  
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**Forged Parts are  
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This Jack can be worked  
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Special Work of all kinds for Street Railways.



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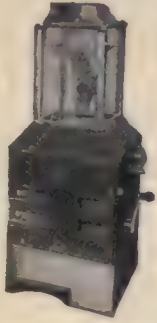
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for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



RAISES the possibility of efficient stoking to a maximum.

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GECO Pneumatic Ashhandling Systems  
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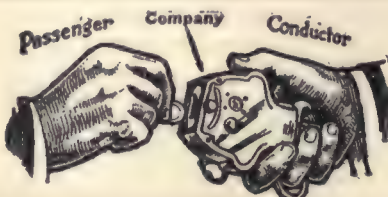
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Insure uniform superheat at temperature specified

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Back-reversing mechanism travels in a Steel Channel Track, making the reversing of seat easy, true and noiseless; a carman readily reverses two rows of seats simultaneously while passing through the aisle.

Pressed Steel End Plates firmly support the Metal Mechanism and Steel Connecting Rails, which in turn are securely riveted to the Pressed Steel Oval Pedestal, making a seat-frame that is well calculated to withstand the hardest usage and outlast the car itself.

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Hale & Kilburn Diagonal Corner Grip Handle ensures safety and satisfaction to the standing passenger.



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The National Standard  
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The only headlining made in one solid piece. Will not separate, warp or blister. Waterproof and homogeneous.

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## WE CAN CUT YOUR COST OF HEATING CURRENT

WRITE FOR THERMOSTATIC CONTROL INFORMATION

# GOLD

**ELECTRIC HEATERS** Cut Installation and Maintenance Charge.

**VENTILATORS** Also Ventilate in Stormy Weather.

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**ORIGINATED** the use of **NON-CORROSIVE** Wire for Electric Car Heaters.

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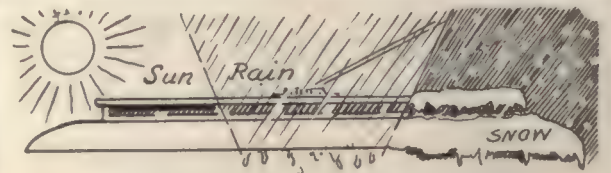
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Gold Car Heating & Lighting Co., 17 Battery Pl., New York

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MANY SYSTEMS ARE USING TULC  
after first making most thorough tests under  
all conditions. Such tests have shown that  
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Made and impregnated to withstand the elements  
Only One Color Coat Necessary at Home

Made from a closely-woven special fabric, every fibre of which is treated with a preservative which renders it proof against the quick deterioration to which ordinary painted cotton duck is susceptible. Neat in appearance—saves time, maintenance and prevents leakage. Three weights, yellow and brown, widths from 22 to 120 inches. Compare the samples!

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It tells how the

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



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This book should be in the possession of all street railway operators.

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"Honeycomb" and "Round Jet" Ventilators for Monitor and Arch Roof Cars, and all classes of buildings; also Electric Thermometer Control of Car Temperatures.

721 W. FULTON ST. Chicago, Ill. Write for Catalogue 1328 BROADWAY New York, N. Y.

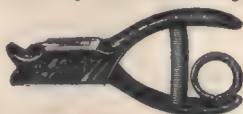
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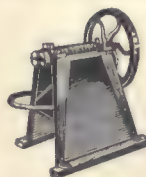


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Patten Ticket Destroyer is used right in the office under the eyes of trustworthy employees. It mutilates beyond redemption.

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All of the above Apparatus is in first class condition  
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Rotary Converters, 25 Cycle

- 2—150 K.W. General Electric type T.C. 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 rpm., complete with 4—60 K.W. General Electric, type H, 25 cycle, 380/13,200 volt, oil cooled, single phase transformers.

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- 2—150 K.W. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 RPM., complete with 4—100 K.W. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy. Above will be sold with or without transformers.

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- 4—75 to 90 H.P. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

## MACGOVERN & COMPANY, Inc.

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114 LIBERTY STREET

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## Steam and Electrical Machinery

**Air Compressors, Pumps, Hoists, etc.**

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

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Commonwealth Bldg. Philadelphia, Pa.

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FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE NOW WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

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### New Tool Steel Gears and Pinions

- 8—64th 3 pitch 6" bore 5" face split.
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These can be used for several different machines.

**IF YOU ARE INTERESTED IN A REAL BARGAIN LOOK THIS UP**

Storekeeper Toronto & York Radial, Toronto, Canada

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Journal advertisers who present facts  
see ample evidence that their  
advertisements are read.

## THE ART OF BUYING

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Service Department is ready to serve you, Mr. Manufacturer.

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239 West 39th Street, New York



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Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplayed advertisements cost **two cents a word**, minimum charge 50 cents an insertion, payable in advance.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Desk Room Wanted or For Rent, Business Opportunities, Employment Agencies, and Miscellaneous

For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplayed advertisements cost **three cents a word**, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

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cost as follows for single insertions:

1/2 p. (1 1/2 x 3 3/4 ins.)	\$5.00	1 in. (1 x 2 1/2 ins.)	\$3.00
1/4 p. (2 1/2 x 3 3/4 ins.)	10.00	4 inches (4 x 2 1/2 ins.)	11.60
1/2 p. (5 x 3 3/4 or 2 3/4 x 7 ins.)	20.00	8 inches (8 x 2 1/2 ins.)	22.40
1/2 p. (10 1/2 x 3 3/4 or 5 x 7 ins.)	40.00	15 inches	40.50
1 page (10 1/2 x 7 ins.)	30 inches		\$80.00

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page	\$80 a page	18 pages	\$56 a page
3 pages	72 a page	26 pages	53 a page
6 pages	64 a page	40 pages	52 a page
12 pages	58 a page	52 pages	50 a page

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### FOR SALE

#### A Metal Opportunity

Take advantage of the high prices of metal. We are cash buyers of all grades of scrap metal. Our specialty is buying electric plants, storage battery plants, storage battery plates and sediment. We buy small lots as well as large lots. Write us and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Co., 30-31 India Wharf, Boston, Mass.

#### Before Buying

## RAILS, CARS, LOCOMOTIVES, Machinery Equipment

Get Zelnicker's September Bulletin containing 40 pages of

### REAL BARGAINS

## ZELNICKER IN ST. LOUIS

423 First Nat. Bank, Chicago  
910 Hennen Bldg., New Orleans

WORKS:  
24th to 26th & McCausland, E. St. Louis, Ill.  
General Office: St. Louis

### MISCELLANEOUS WANTS

#### Meet Me at Convention

Safety first. Fare collections, consumption of power, schedules, handling of equipment. If interested, write me. Will meet you at convention. "Efficiency Man," Elec. Ry. Jour.

#### Railway Motors Wanted

Four second-hand railway motors in good condition, 500 volt, 125 to 150 hp. Box 1191, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

ACCOUNTANT-Auditor — An accountant of exceptional technical and executive ability, recently auditor of a light and power company, serving 45,000 consumers, is now at liberty to consider an offer of similar position. Experience with certified public accountants, telephone companies and railway and light company. Age 38. Box 1198, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

AUDITOR—Experienced electric and steam railway work and conversant with ICC and State requirements, desires position. Employed. Chicago location preferred. Box 1200, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

TECHNICAL graduate, 36, married, now employed as chief electrician in charge of car equipment (construction and operation) desires new position. Experience covers all classes of street car and high speed interurban Sprague and Westinghouse multiple unit systems (600 and 1200 volt) and modern 1200 volt locomotives. Fifteen years in the field (at home and abroad). Excellent references, correspondence solicited, locate anywhere. Box 1196, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

### POSITIONS VACANT

MANUFACTURER of fuel-saving, smokeless combustion system now being widely installed wants sales engineer representatives to cover territorial divisions. Box 1197, Elec. Ry. Jour.

### AGENTS AND SALESMEN

#### Agency Wanted for New York

We are in a position to handle another account. If you desire an efficient sales and engineering representative, write to us. We have had 20 years' active experience in the electrical and mechanical fields and ask your investigation. Dale-Rey Corporation, 150 Lafayette St., N. Y. City.

#### Can Produce the Business

Experienced railway supply salesman desires new connection. Is energetic, a hard worker and producer of new business. Well acquainted with trade. Box 1187, Elec. Ry. Jour.

## Obsolescence

Have you some equipment, machinery or supplies that ought to be moved? And if a buyer could be found, wouldn't it be easy to convert this into cash?

Our Searchlight Service will be the finder for you. It will help you to locate some one who would be glad to pay you service value now for what you might otherwise sell at scrap value.

Better look over your stock and send us a trial advertisement. The cost will be slight; the results may surprise you.

## ELECTRIC RAILWAY JOURNAL



## For General Testing

in Electric Power Plants, or for Outdoor Work

# Weston

Model 45

### D. C. Portable Ammeters and Voltmeters



Designed to meet the demand for a medium-priced Ammeter and Voltmeter. Their accuracy is guaranteed within 1 per cent.

They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1/10 of a division at any part of the scale.

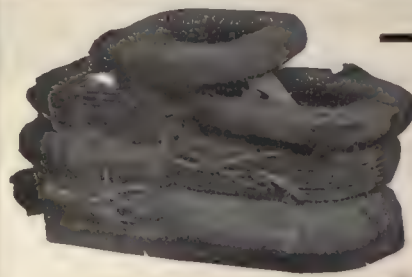
In mechanical and electrical workmanship the Weston Model 45 Portable Ammeters and Voltmeters practically attain perfection.

A full description will be found in Bulletin 501, which will be mailed to you on request.

### Weston Electrical Instrument Co.

21 Weston Ave., Newark, N. J.

New York	Chicago	Detroit	St. Louis	Montreal
Boston	Buffalo	Pittsburgh	Toronto	Paris
Philadelphia	Cleveland	Denver	Winnipeg	London
Richmond	Cincinnati	San Francisco	Vancouver	Petrograd



—This  
Is  
False  
Economy

Old coils are old coils because of the insulation—not because of the copper. The copper is 100% pure—too high grade for casting purposes—too high priced to sell as scrap.

## Independent Treatment Is True Economy

It makes out of an old coil a new one of similar characteristics, but better in point of insulation. That is because Salamander Pine Asbestos is used—for asbestos insulated coils can be impregnated at a temperature that would destroy cotton insulated coils.

Independent Treatment includes our highly developed processes, modern appliances, and skilled labor—all at a trifling price—merely that of the actual insulation used.

Better write for our proposition today or send a few old coils for demonstration.

### Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York  
Factories: York, Pa., and Weehawken, N. J.

## U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY  
Chicago Washington, D. C.

## RAILWAY SUPPLIES

### SELLING AGENTS FOR

Tool Steel Gears and Pinions  
Johnson Fare Box  
Perry Side Bearings  
Hartman Centering Center Plates  
Wasson Trolley Bases  
Garland Ventilator  
Electric Arc Welders  
High Class Railway Varnishes  
and Enamels  
Chillingworth Seamless Gear Cases

Special Agents for { Tool Steel Gear & Pinion Co.  
Johnson Fare Box Co.  
C. & C. Electric & Mfg. Co.  
Holden & White

General Agents for Anglo-American Varnish Co.  
Eastern Agents for Union Fibre Co.  
Southern and New England Agents for Thayer & Co.

THERE IS A

## VAN DORN COUPLER

for every condition and every requirement.  
Send for information and blueprints.

VAN DORN COUPLER CO.,

2325 So. Paulina St.

Chicago, Ill.



"Trade Mark Reg. U. S. Pat. Off."

### Samson Spot Waterproofed Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 SAMSON CORDAGE WORKS, BOSTON, MASS.

### ELECTRIC RAILWAY DEVICES

Rectifier for Frozen Air Pipes.  
High Power Compact Hand  
Brakes, Gear or Differential Types.  
Sterling Light Weight  
Roller Bearing Trolley  
Bases.  
Screenless Air Cleaners  
for Compressors  
Sterling Sand Boxes.  
Berg Fenders and Wheel  
Guards.



Multi-Vapo-Gap Lightning  
Arresters and Hydrogrounds.  
Trigger Lock Reversible  
Controller Fingers.  
'Q-P' Trolley Catchers.  
Soldered Rail Bonds.  
Friction and Insulating  
Tapes.  
Sterling Ticket Punches.  
Controller Handles.

LORD MFG. CO.,  
105 W. 40th St., New York

## The Eclipse Railway Supply Co. CLEVELAND, OHIO

Manufacturers of the  
ECLIPSE LIFE GUARD  
ECLIPSE TROLLEY RETRIEVER  
ECLIPSE WHEELGUARD  
ACME FENDER



**Uniform  
Reliable  
Efficient**



Try them. They  
tell their own story

**W. J. Jeandron**

173 Fulton Street  
New York City

Pittsburg Office:  
636 Wabash Building

Canadian Distributors  
Lyman Tube & Supply Co., Ltd.  
Montreal and Toronto



At work on lines of the United Traction Co., Albany, N. Y.

## **“IMPERIAL” TIE TAMPERS**

Will enable you to complete your season's construction or repair work in much less time than you would otherwise require.  
Two pneumatic tampers will do the work of eight men hand tamping—and that's a big item, with labor so scarce.  
“Imperial” Tampers reduce tie tamping costs to the bed rock level.

BULLETIN 9023 tells how.

ASK FOR A COPY.

**INGERSOLL-RAND COMPANY**

11 Broadway  
New York

165 Q. Victoria St.  
London

31-TT

## **“Watch Your Step”**

If it has  
Universal Safety Tread  
on it,  
Proceed in Safety.  
If Not,  
Be Careful

**Universal Safety Tread Co., Waltham, Mass.**

New York

Philadelphia

Chicago

## **UNION SPRING & MFG. CO. SPRINGS**

**COIL AND ELLIPTIC**

**M. C. B. Pressed Steel Journal Box Lids**

General Office: First Nat'l Bank Bldg.  
PITTSBURGH, PA.

Works: New Kensington, Pa.

50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.  
Missouri Trust Bldg., St. Louis, Mo.

**PROVIDENCE**

FENDERS

**H-B**

LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.  
Manufacturers of The Providence Fender and H-B Life Guard  
Wendell & MacDuffie Co., 61 Broadway, New York  
General Sales Agents

**S-W Shim Slack Adjusters Save  
Brakeshoes and Labor**

SMITH-WARD BRAKE COMPANY, Inc.  
17 Battery Place, New York

W. R. Kerschner Co., Inc.  
Eastern Sales Agents  
50 Church St., New York City

The result of the best  
practice in electric rail-  
way work is recorded  
every week in the Elec-  
tric Railway Journal.





## RADIO-THRUST JOURNAL BOXES

are so designed that they can carry a larger load than other bearings, because of the means for taking up thrust. Smaller bearings cost less money and mean easy adaptation to your clearance conditions.

**GURNEY BALL BEARING CO.**  
CONRAD PATENT LICENSEE  
Chicago JAMESTOWN, NEW YORK New York

# BRAKE SHOES

## A Road May be Proud of Its Braking Efficiency

Yet it may be wrong to conclude that the type they use should be on *your* cars. Your operating conditions are probably different. What is profitable for one line may be unsuited to many others. The easiest way to make *sure* of getting maximum braking economy and efficiency for *your* road is to consult specialists. That is our business. Consult us.

Awarded Gold Medal, Panama Pacific Exposition

**American Brake Shoe & Foundry Co.**  
30 Church St., New York  
McCormick Bldg., Chicago Chattanooga, Tenn.

3

## Holden & White

Electric Railway Accessories

*See Our Advertisement  
in the Convention Issue*

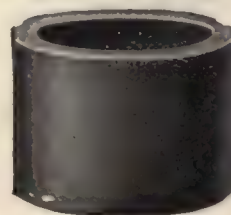
1508 Fisher Building

CHICAGO

## LONGWEAR BUSHINGS

For Brake Gear

Hardened  
Steel  
Accurate  
Uniform



also  
LONGWEAR  
BRAKE PINS  
to  
Specifications

**E. G. Long Company**

50 Church Street

New York

## The Baldwin Locomotive Works

Philadelphia, Pa.

**ELECTRIC MOTOR  
and TRAILER TRUCKS**



**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading Railroads. For details address  
**AMERICAN MASON SAFETY TREAD CO.**  
Main Offices: Lowell, Mass. Branch Offices: Boston, New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.

## Ventilation—Sanitation—Economy—Safety

All Combined in

**THE COOPER FORCED VENTILATION HOT AIR HEATER**

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

**THE COOPER HEATER CO., CARLISLE, PA.**



# The St. Louis Car Company

QUALITY SHOPS

8000 N. Broadway  
St. Louis

# THE CINCINNATI CAR COMPANY

WORKS:  
WINTON PLACE  
CINCINNATI, OHIO



## Bishareen

One of the sideshows of Assouan is the Bishareen village—an odoriferous encampment of Arabs permitted outside the town.

They live on the pittances thrown to their children, who dance alongside of tourists passing through.

The curious antics of the kids usually attract interest and a few pennies.

It is this same throwing away of small amounts of money on freak things that enables many manufacturing companies to spring up—some in the carbon brush business.

But freak brushes have never and can never hope to make a dent in the main artery of legitimate brush business.

Morganite brushes have no cure-all freak features to sell them. They are sold only on engineering prescription. If the machine needs freak brush characteristics to make it run right—a Morganite brush with those characteristics is produced.

The pennies spent for Morganite represent dignified investment yielding profitable return.

They aren't sold as souvenirs of an unthinking tour.



Factory, Brooklyn, N. Y.

AGENTS:

Lewis & Roth Co., 312 Denckla Bldg., Philadelphia

Electrical Engineering & Mfg. Co.

First National Bank Bldg., Pittsburgh

W. L. Rose Equipment Co.

La Salle Bldg., St. Louis, Mo.

Herzog Electric & Engineering Co.,  
150 Steuart Street, San Francisco, Cal.



[illegible]





Twelfth  
Street Bridge

St. Louis  
Missouri

## TITANIUM On a St. Louis Bridge

When this fine reinforced concrete bridge was built along Twelfth Street, St. Louis, it was necessary to put down a first-class track to carry 190,000 cars, averaging 45,000 lb. each, per annum. So this was the specification for the construction of 1914.

Rail 103 lb. 7 in. Lorain section 426, placed on  $4\frac{1}{4}$  in. steel ties 6 ft.

8 in. long and set in a solid concrete foundation.

Rail composition: Carbon, 0.70 to 0.85; silicon not over 0.20; phosphorus not over 0.04; manganese, 0.60 to 0.90.

**Rail treatment—Titanium.**

Make the clause calling for Titanium treatment an indispensable part of your rail specification.

## TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

General Office and Works:  
Niagara Falls, N. Y.



Processes and Products Patented

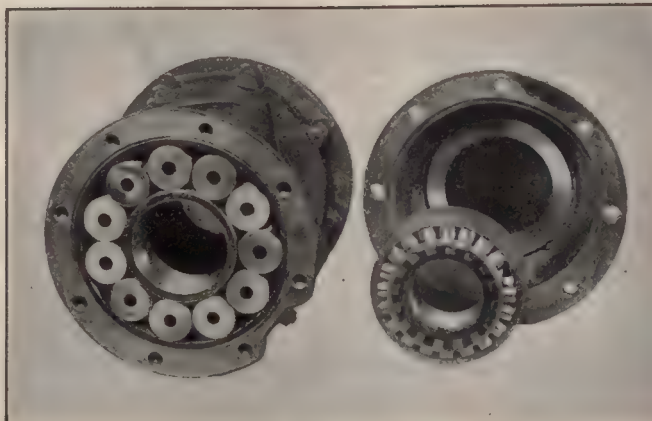
Pittsburgh Office: Oliver Building  
Chicago Office: Peoples Gas Building

New York Office: 15 Wall Street

### AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland  
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England





PARTS OF ROLLWAY BEARING

## A Deadly but Profitable Parallel

When the Empire United Railways, Inc., Syracuse, N. Y., as you saw in Messrs. Voth and Metcalfe's article of May 6, wanted to know the honest-to-goodness facts about

### Rollway Bearings

it applied the deadly parallel between a Rollway Bearing car and a plain bearing car of the same weight (70,000 lb.) on the same schedule. Here is the parallel for

ENERGY AND LUBRICATION COSTS		
	Plain Bearings	Roller Bearings
Annual mileage .....	103,446	103,446
Energy consumption, kilowatt-hours.....	372,405	327,717
Energy cost, at 1 cent per kilowatt-hour.....	\$3,724.05	\$3,277.17
Cost of oil .....	10.35	1.04
Cost of waste .....	4.14	....
Cost of rebabbitting, labor and material....	10.36	....
Cost of labor for oiling.....	8.27	0.52
Cost of labor replacing oil every 1000 miles..	3.11	....
Total annual cost .....	\$3,760.28	\$3,278.73
Difference in annual saving, \$481.45 or 12.8 per cent.		

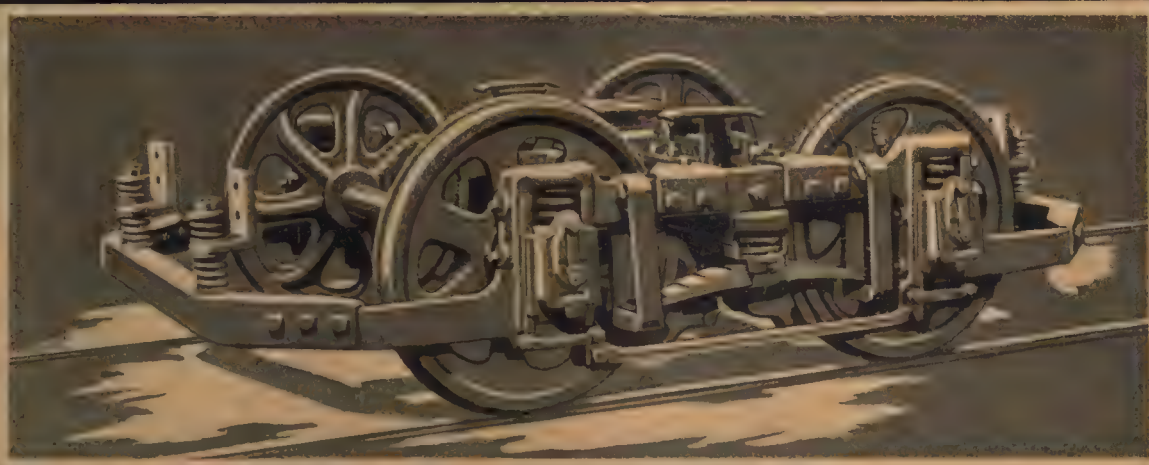
The saving in one year was \$481.45; the cost of the Rollway Bearings was only \$434.00.

*Think it over !*



The Railway Roller Bearing Co.  
SYRACUSE, N. Y.



**BRILL**

## Brill 76-E Truck

**T**HE combination of solid-forged side frames, angle end frames, deep angle transoms fastened to the side frames with single- and double-corner brackets and fold-over gusset plates, one-piece cast-steel bolster, oil-retaining center plates, "Half-ball" brake hangers, graduated spring system and bolster guides, gives the Brill 76-E Truck its superior strength and riding qualities. The Brill Graduated Spring System puts in play a set of soft-acting spiral springs when the car has no more than a seated load of passengers. The Brill Bolster Guide eliminates the necessity for chafing plates with their friction and locking effect under brake pressure and motor force.

THE J. G. BRILL COMPANY,  
AMERICAN CAR COMPANY,  
G. C. KUHLMAN CAR COMPANY,  
WASON MFG. COMPANY,

PHILADELPHIA, PA.  
ST. LOUIS, MO.  
CLEVELAND, OHIO  
SPRINGFIELD, MASS.



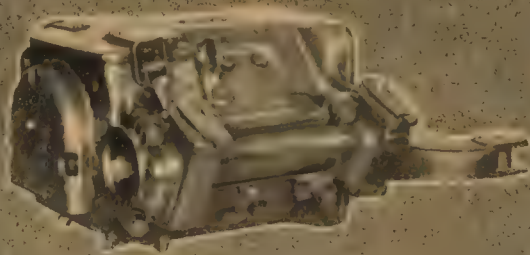
## Look them Over at the Convention



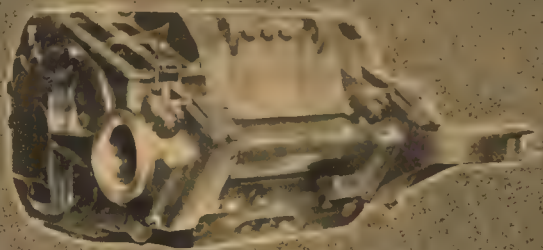
**Light**—See the latest refinements on the G-E 203—first shown at the 1911 Convention.



**Lighter**—Then look at the G-E 247—24" wheel motor.



**Lightest**—And then see the new G-E 258 ball bearing motor.



**Subway**—The G-E 260 195 hp. ventilated motors used in New York.



**Steam Road Electrification**  
—G-E 253-A three thousand volt motors used on the Chicago, Milwaukee & St. Paul.

# General Electric Company

General office  
Schenectady, N. Y.



Sales offices  
in all large cities



Building Up Electric Railway Receipts In Binghamton

# ELECTRIC RAILWAY JOURNAL

New York, October 7, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 15 10c a copy



On Cars of the Brooklyn Rapid Transit Co.

## AGASOTE Roofing

is lowest in first cost and in last cost—highest in durability and appearance. It reduces building cost, operating cost and maintenance cost. You can depend on Agasote Roofing and

## Pantasote Curtains

**The Pantasote Company**  
New York      San Francisco      Chicago



In Cars of the Lehigh Valley Transit Co.





## Off For the Convention

### *"The Market Place of Our Industry"*

"JOE," said the General Manager, "we're on the way to the greatest Convention in our history. These conventions mean more than they used to. We have many vital problems before us that can be solved much easier and better after we have discussed them pro and con with many other railway men and manufacturers whom we will meet there. We all appreciate more fully what a great opportunity it is for us to study the manufacturers' exhibits and go home fully posted on the latest devices and improvements that the art has developed."

"You're absolutely right, Boss," replied Joe. "That's the reason I recommended that we send more of our men. It's too much for one or two to fully absorb. The Westinghouse exhibit alone will take a couple of days. I personally want to see the Westinghouse No. 506 and No. 514 light weight motors and their one-piece HL control. Our men have been instructed to study carefully Westinghouse repair parts, insulating materials, line material, etc., as well as Nuttall gears and pinions."

**Westinghouse Electric & Manufacturing Co.**

Sales Offices in All  
Large American Cities



East Pittsburgh,  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 15

NEW YORK, OCTOBER 7, 1916

PAGES 705 to 752

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The Condenser Lightning Arrester for Electric Railway Protection—By Q. A. Brackett.

An Inclosed-Fuse Switch. Automatic Tap-Chargers for Voltage Regulation.

A Recent Projector. Shockless Crossing Now Equipped for Automatic Operation.

Semi-Inclosed Transformers. Railways Use Calculating Machines to Increase Office Efficiency.

A New Low-Floor Car Control. Improvements in Standard Truck Construction.

A Recent Design of Reverse-Phase Relay.

Control Equipment of New Toledo Cars. Brake Lever Strut for Slack Adjusters.

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

MCGRAW PUBLISHING COMPANY, INC., 239 WEST 39TH STREET, NEW YORK

CHICAGO, 1570 Old Colony Bldg.  
CLEVELAND, Leader-News Bldg.

PHILADELPHIA, Real Estate Trust Bldg.  
SAN FRANCISCO, 502 Rialto Bldg.

LONDON, 10 Norfolk St., Strand.  
Cable address: "Stryjourn," New York.

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No back volumes for more than one year, and no back copies for more than three months.

One week required for change of mailing address. New and old addresses must be given

Circulation of this issue 7350 copies





## A Specialty and its Specialists

A Manager recently remarked to his President:

"We use Westinghouse air brakes because they're the best. They're made by specialists who make nothing but air brakes and give their undivided attention to that. They have the experience of a lifetime and know the business from A to Z.

Then there's their field corps of engineers and expert inspectors—it's the best thing I ever saw—and it's free. They'll work out any braking problem for you and supply you with the brake best suited to any particular class of service. We rely on them absolutely and call them in right along. They've helped us over many a rough place and saved us thousands of dollars real money."

*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



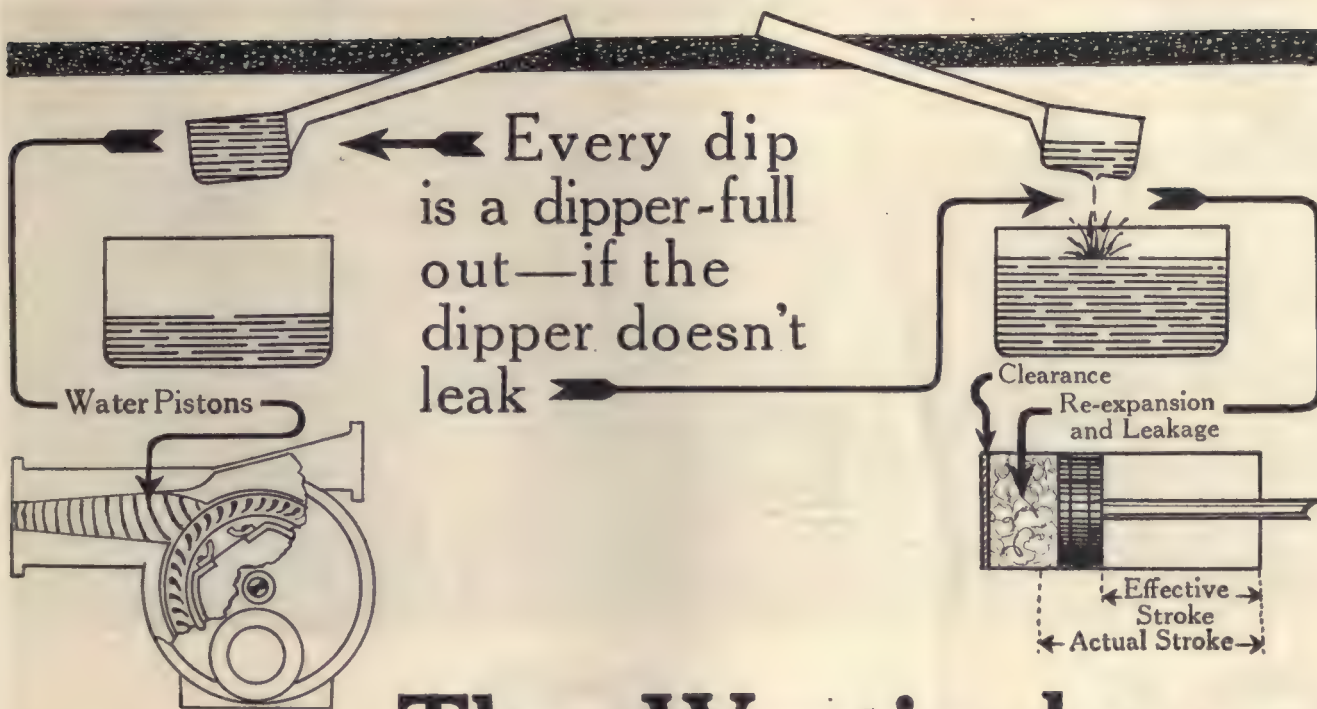
NEW YORK:

City Investing Building

ST. LOUIS:

Boatmen's Bank Building





# The Westinghouse Leblanc Air Pump

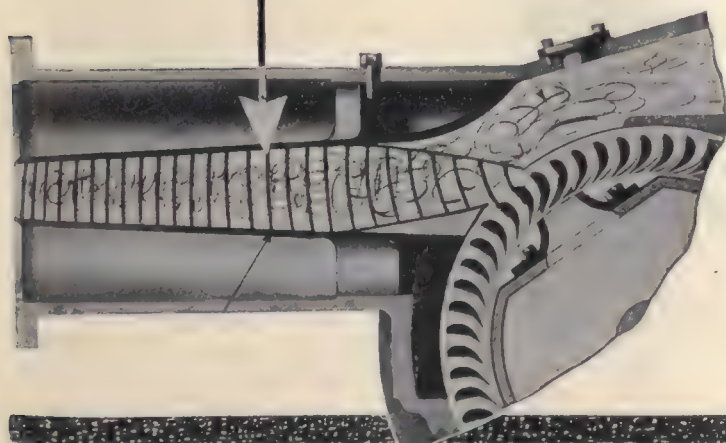
with which all Westinghouse Condensers are equipped, is like a bright, new dipper in its operation. Every water piston is a dipper-full out—with no back drip. The water pistons follow each other in such rapid succession that the removal of air is as sure and as constant as the law of gravitation.

This is one of the "secrets" of the

## High Vacuum

and the satisfactory operation of our Condensers.

**Westinghouse  
Electric & Mfg. Co.**  
East Pittsburgh, Pa.







# Phono-Electric

## The Wire of Long Life

In October, 1909, the Philadelphia Rapid Transit Company strung some 18,000 ft. of No. 0000 Phono-Electric Trolley Wire over Seventeenth Street between Clearfield Avenue and Sansome Street.

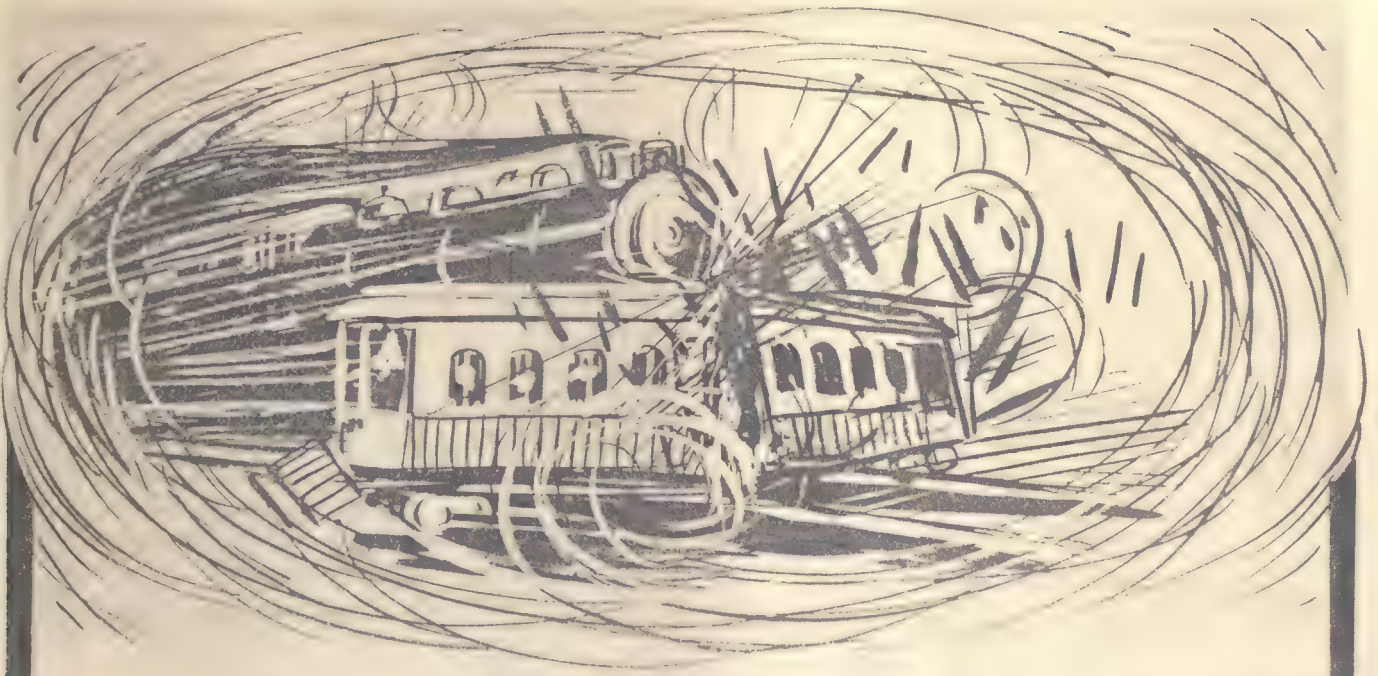
And it's still over Seventeenth Street!

During these seven years the price of copper has soared out of sight, labor and supply costs have seriously increased and the public has been educated to ever-higher standards of service.

But the user of Phono-Electric has remained serene in the possession of a wire that doesn't weaken at the spans, because it has no surface hardening to craze or break; that doesn't call for line crews and emergency wagons and that doesn't cause one minute's delay in service chargeable to the trolley wire.

**BRIDGEPORT BRASS CO**  
BRIDGEPORT CONNECTICUT





## Grade Crossings Worry You?

### Remove the Big Hazard

The jumping trolley which leaves a car stalled without power is a constant danger on unprotected grade crossings.

## National Trolley Guard

catches the trolley wheel if it jumps the wire and supplies the car with power to carry it to safety.

National Guard is made from one piece of wire mesh.

It offers little resistance to the passage of locomotive exhausts or heavy wind. Will not collect snow or ice to any extent. Is light in weight and easily installed.

*Full details and prices from*

**The Ohio Brass Company**  
**Mansfield, Ohio**





Everybody's going to the big convention. Business cares and worries will be put aside. Tom, John and Jim will meet Bill, Joe and Harry and we've arranged our booth to meet you all.

Consider this a cordial invitation to make our booth your convention headquarters. We've arranged our exhibit at booth 337 with that in mind. You'll find there plenty of comfortable chairs and just the apparatus that will interest you.

We shall have on exhibit, too, our miniature train and signalling system. Don't go home without seeing it.

**WE'LL BE LOOKING FOR YOU!**

*Western Electric Company*  
INCORPORATED



## United States Block Signal Equipment

# Can Be Capitalized



The statement has been made, conservatively, that about 65% of all noted railway accidents could be prevented by a complete block signal system.

This means that for every \$1000 you pay in accident cost —\$650 of it could be saved by U. S. Electric Signals.

1000
.65
<hr/> \$650.00

Capitalize the \$650 at 5% and you have \$13,000 available for signal equipment on each thousand dollars it has cost you for accidents.

05	650.00
<hr/>	\$13,000

For a small part of this sum an average road can have complete signal protection.

Apply these figures to your 1915 accident costs—then let us show you the direct financial benefit possible from U. S. Signals aside from the operating economies they make possible. Write us.

## United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.







# Light Signals



On the Electrified Lines  
of the Chicago, Milwaukee &  
St. Paul Railroad, over the Big  
Belt and Rocky Mountains.



# THE UNION SWITCH & SIGNAL CO.

TRADE



MARK

Founded by Geo. Westinghouse 1881.

SWITZVILLE, PA.

Hudson Terminal Bldg.  
New York

Peoples Gas Bldg.  
Chicago

Canadian Express Bldg.  
Montreal

Candler Annex  
Atlanta

Railway Exchange Bldg.  
St. Louis, Mo.

Pacific Bldg.  
San Francisco



## Keystone Cord Connectors

*Don't Do This—*



*Nor This—*



*But Do This!*



*With Keystone Cord  
Connectors and These  
Pliers*



*ALWAYS DO THIS—*Use Keystone Cord Connectors to connect your broken Bell, Register or Trolley Cords. They have annular ribs on the inside which bite into the cord and won't let go. They alone offer the only quick, easy, strong, cheap way of connecting your cords. Write for a sample Keystone Cord Connector.

## Keystone Portable Lamp Guards

*These Lamp  
Guards Need No  
Protection*



No. 12504



No. 18897



*They're  
Stronger Than  
the Men Who  
Use Them*

Give your men the strong Keystone Portable Lamp Guards and they will work more efficiently because they can then give full attention to their work. Keystone Portable Guards require no attention or protection. They are so strong a man can stand on them, kick them or throw them about without injury to lamp or guard. Order them now.

## ELECTRIC SERVICE SUPPLIES Co.

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA  
17th and Cambria Sts.

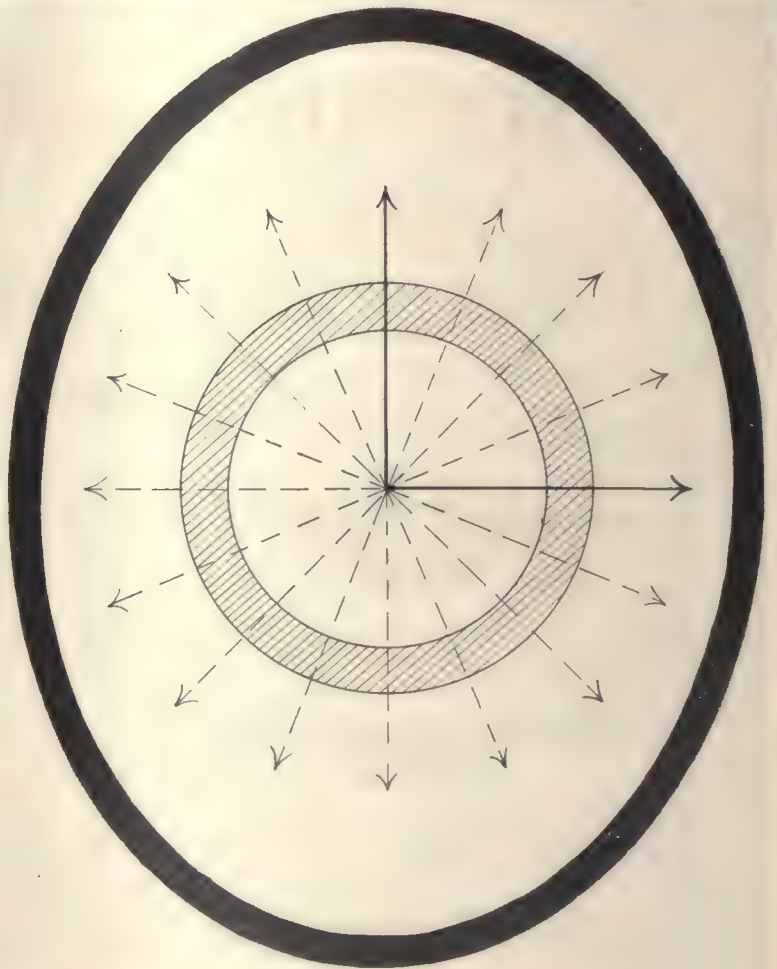
NEW YORK  
50 Church St.

CHICAGO  
Monadnock Bldg.



# ELRECO Tubular Poles

Show same deflection  
under load applied in  
any direction



Because of its circular form, the Elreco Tubular Pole is the only pole that can be installed without regard to the direction or strain of load to be carried.

Applying a given load to a Tubular Steel Pole at right angles to its length produces same stress regardless of the direction in which the load may be applied.

You know how important this feature is whenever you want a pole to take strains from several different directions. Elreco Poles simplify installation and construction engineering work.

Why should you install two poles of other shapes for corners or curves when one Elreco Tubular Pole would serve?

Elreco Tubular Poles also have much reserve strength. The extra tension from a span wire which has been struck violently by a car pole produces no permanent set. Actual service under all conditions show that Elreco Poles excel in this regard.

Catalog No. 16 contains most valuable and useful data on "Pole Engineering." Write for your copy.

## Elreco Tubular Poles

Combine  
Lowest Cost  
Lightest Weight  
Least Maintenance  
Greatest Adaptability

# Electric Railway Equipment Co.

Cincinnati, Ohio

New York: 30 Church Street



# THE SIMMEN SYSTEM

of Continuous Cab Signals has the science of signaling boiled down to fundamentals

Why not investigate its possibilities for lowering costs and preventing accidents on your road?



WITH this system of train operation and control, this dispatcher sits calmly at his desk and

- Can see every move of every train
- Can determine how fast each train is moving
- Can tell where any train is at any given moment
- Can flash a commanding and unmistakable signal right in the cab of the car within a few inches of the motorman's eyes, with a single movement of one of his control switches.
- Can give a complete "meet" or advance order

by a single, simple movement of a control switch

- Cannot make a mistake and lap two trains on a "meet." His own levers won't let him—they interlock.

No semaphore arms. No expensive line apparatus. No time wasted. No mistakes. No red tape.

And, with all these startling exclusive features, the Simmen System is one of the simplest railway signaling systems ever devised.

It has been successful and economical on every installation. In the same way it will serve you.

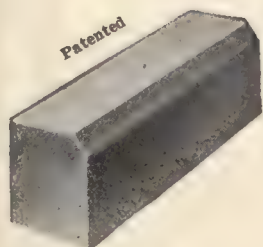
*We will be pleased to send you further information*

**SIMMEN AUTOMATIC  
RAILWAY SIGNAL CO.**

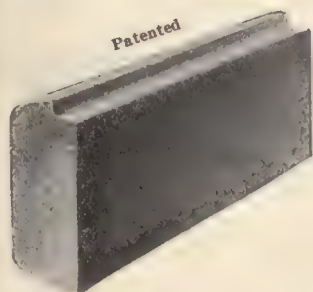
**1575 Niagara St., Buffalo, N. Y.**

PACIFIC COAST REPRESENTATIVE  
W. H. CRAWFORD, 609 Spalding Building  
Portland, Oregon

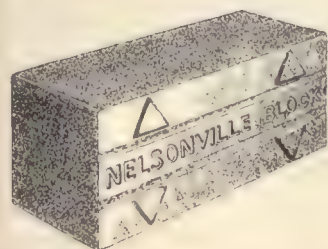




**Nelsonville  
Stretcher  
Brick**



**Nelsonville  
Filler  
Brick**



**Nelsonville  
Block**

## Why Should It Cost As Much to Maintain Pavement As Track?

In Chicago at the beginning of 1914 paving in the track allowance represented an investment of \$7,373,683, or about one-fifth of the total track cost, yet the pavement maintenance cost was approximately equal to that for the track.

This brings out the importance of selecting a pavement with due regard to the cost of its maintenance. Nelsonville Patent Rail Brick offers a considerable saving in maintenance due to the fact that the ungrouted joint between the filler and stretcher breaks up the rail vibrations and prevents any displacement of brick in the pavement. In this construction all such maintenance cost and annoyance as results from the "kicking up" of the old style nose brick is eliminated. Then, too, track costs can be lowered by installing T-rail instead of the more expensive girder rail.

## NELSONVILLE BRICK

MAKES A

**Smooth Pavement That Stays Smooth**  
and a smooth pavement is in demand today, whereas a decade ago smooth pavements were objectionable because they were too slippery for horse-drawn vehicles.

*Write for this Booklet*

Let us send you sample bricks and our booklet—  
"Rail Brick of the Right Sort."

**The Nelsonville Brick Co.**

Nelsonville, Ohio



# You Can't Get a Dollar's Worth On a Two Bit Expenditure

When Ruskin said "Those things called dear are, when justly estimated, the cheapest," he hit the nail on the head.

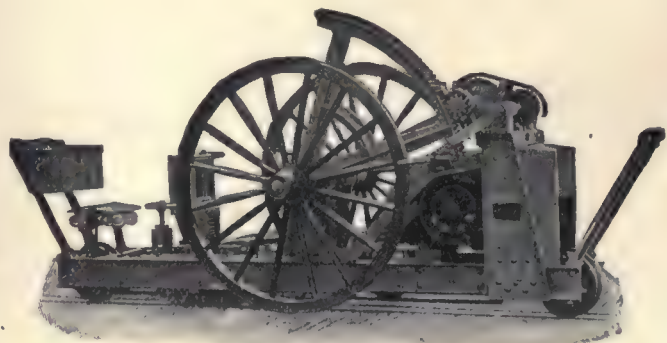
It's just as true in buying track grinders as in buying anything, that you can't get a dollar's worth on a two bit expenditure. You can buy grinders and grinders and be led to believe by low first cost that they are cheap. But if you "justly estimate" them you will find they are the dearest in the long run—and long run cost is the true basis for judging a grinder.

## The Reciprocating Track Grinder is the cheapest grinder in the long run

Its first cost is a sound investment, which nets handsome returns in the way of savings in time, labor, rail, and wear on rolling stock. The reciprocating motion of its long, flat grinding element makes skilled labor and skilled adjustment unnecessary. It grinds out the bad spot, the whole bad spot, and **nothing but** the bad spot the first time. Think of what a saving that is to the rail.

We want to place a trial grinder on your tracks. If you "justly estimate" that it will prove cheapest in the long run, pay for it. If not, return it at our expense.

**The Railway Track-work Co.**  
30th and Walnut Sts.,  
Philadelphia







## International Steel Twin Ties Used for Park Strip Open Work at Boston

Within the past year the Boston Elevated Railway has put down on famous Huntington Avenue about 1000 ft. of International Steel Twin Ties spaced 6 ft. centers under 80 lb. A. S. C. E. rails.

It is significant that these

ties have been selected for open construction where the only protection against weather is adequate drainage.

International Steel Twin Ties are adapted to either open or closed types of city construction.

**The International Steel Tie Company**  
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal.,  
Los Angeles, Cal., Seattle, Wash.

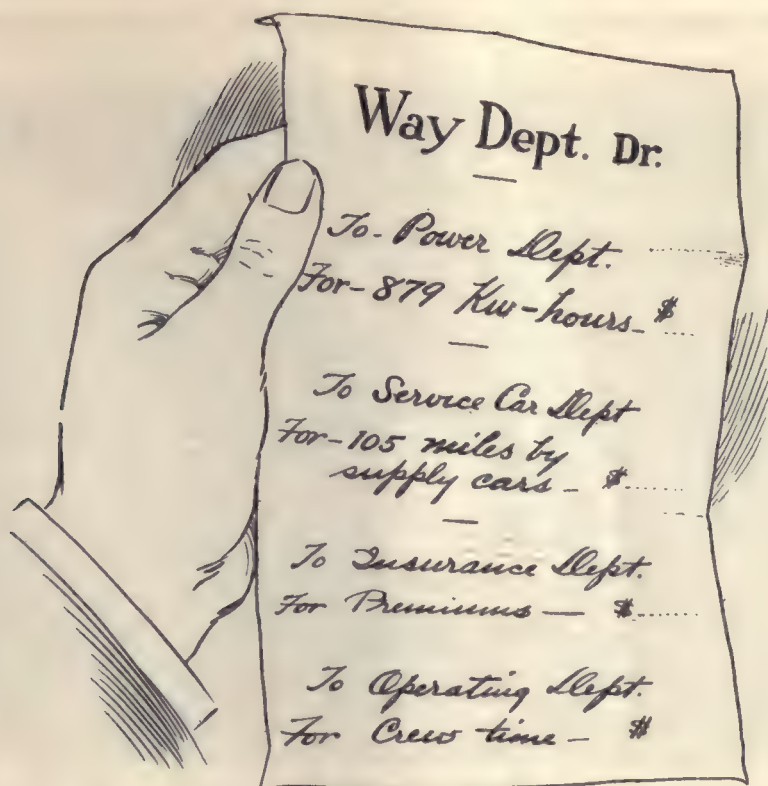
R. J. Cooper Co.,  
Salt Lake City, Utah.

J. E. Lewis & Co.,  
Dallas, Texas.

Maurice Toy,  
Philadelphia.

William H. Ziegler,  
Minneapolis, Minn.





# The Thermit Insert Weld

*gives you*

***Lowest Actual Cost and Longest Life***

If inter-departmental accounting and overhead charges were put into practice on your system, the order of cost for different rail joints would show some startling changes.

The true cost of a rail joint is not the labor and material charge paid by the way department; it is the cost paid by the company as a whole.

How many engineers figure the item of current into their cost of electric welding as an item corresponding to the cost of the Thermit?

How many include an insurance item to cover damage to property and injury to men?

How many allow for the operating expense of the service cars used?

How many realize that the unit cost of the Thermit Insert Weld is practically the same for a few joints as for many?

How many remember that the life of the joint is the life of the rail and make an amortization charge accordingly?

How many penalize themselves for injuring the service of the transportation department by the use of complicated and non-portable equipment?

If such items are considered, it will be found that with due allowance for depreciation and maintenance, irrespective of its longer life,

***The Thermit Insert Weld Enjoys the  
Lowest Actual Cost***

**GOLDSCHMIDT THERMIT CO.**

**120 BROADWAY, NEW YORK**

329-333 Folsom St., San Francisco

103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago







## In the Columbia Foundry

We wish you could visit our works to see for yourself the splendid equipments that are used by this organization for the manufacture of

### Columbia-Made Trolley Wheels and Axle Bearings

and the thousand and one other castings that are a part of electric railway apparatus.

Longest life for the wheel and least wear for the wire demand a trolley

wheel of perfect balance and that "just-right" shape and formula.

The combined experience of our customers, added to our foundry facilities, insures you satisfactory trolley wheels at a satisfactory price.

And many other Columbia-made specialties are at your service, such as the following:

#### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

#### CAR EQUIPMENT

Armature and Axle Bearings  
Armature and field coils  
Bearings (Bronze and Iron)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or mall. iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



—and the fuses  
must blow without  
noise or flame!

On any big city transit system, prevention of panic among passengers is every bit as important as protection for the apparatus.

That is why all the fuses on all the cars of the Interboro Rapid Transit Company, New York, are

## "D & W" Fuses

With its heavy underground trains speeding at gaits up to 50 miles an hour, on the short headway demanded by the service, the Interboro simply can't afford to take any kind of chance with the safety of thousands of passengers.

It **must** have fuses which deserve 100 per cent confidence—and its demands are met only by "D & W" Fuses.



# D & W FUSE CO.

Providence, R. I.

A. Hall Berry, 97 Warren St., New York

Agents—Pettingell-Andrews Company

Western Electric Company

Central Electric Company

23 fuses on each of 1023 electric motor cars.....	23,529
9 fuses on each of 751 elevated trailers.....	6,759
31 fuses on each of 665 high-voltage control sub-way motor cars.....	20,615
17 fuses on each of 291 high-voltage control sub-way trailers.....	4,947
28 fuses on each of 124 low-voltage control sub-way motor cars.....	3,472
15 fuses on each of 62 low-voltage control sub-way trailers.....	930
60,252 Fuses.....	







## Get the Outside Viewpoint on the Inside of Your Power House

Consider lubrication. It's a far-reaching subject. Under your present system, its cost-reduction may be impossible because the men are too close to the proposition to see any weak points. The application of the outside viewpoint is why

### Galena Oils and Galena Service

combined, reduce lubricating costs. We come to you with a contract—it guarantees to reduce your lubrication cost 10%

below what you are now paying for other oils.

We don't work against your men. We work with them.

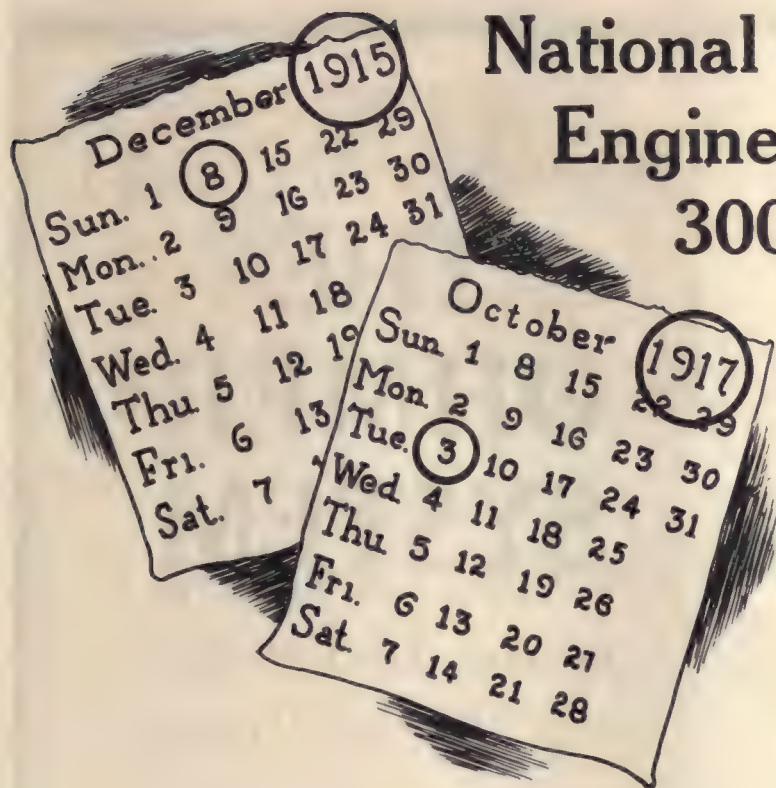
Why not get the details of our cost-cutting co-operation?

# Galena-Signal Oil Co.

Franklin, Pa.







**National Pneumatic  
Engines will make  
300,000 Movements  
between  
Lubrications:**

**666  
Days!**

Can you realize the import of a specification like that of the New York Municipal Railway Corporation, Brooklyn, which asked for a door engine capable of making 300,000 movements between lubrications?

It means that on the basis of 450 complete operations per door per day of the engine, it would not have to be lubricated for 666 days, or nearly two years.

This specification has been met easily by National Pneumatic engines because the rack, the gear, gear shafts and piston washers run in a continuous bath of grease.

And they'll stay lubricated over any range of temperature, too!

**NATIONAL PNEUMATIC COMPANY**

50 Church St. New York



515 Laflin St. Chicago





# THE OHMER SYSTEM

**A**N Ohmer Fare Register in a car is a sign of good business sense on the part of the management. It means that the subject of fare accounting has been fully considered and a method adopted which is in keeping with the most approved ideas of modern business.

You pay your conductor for his time, but under the OHMER SYSTEM, he becomes more than a mere time-server. He is glad to give you his full co-operation, his best energy, and to work for the best interests of the business.

The increasing success of the OHMER SYSTEM has proven that the "Human Factor" is the most important consideration in matters of fare protection. It has also proven that the "Human Factor" can be controlled in a very practical way for the promotion of better business and a better relationship between manager and man.

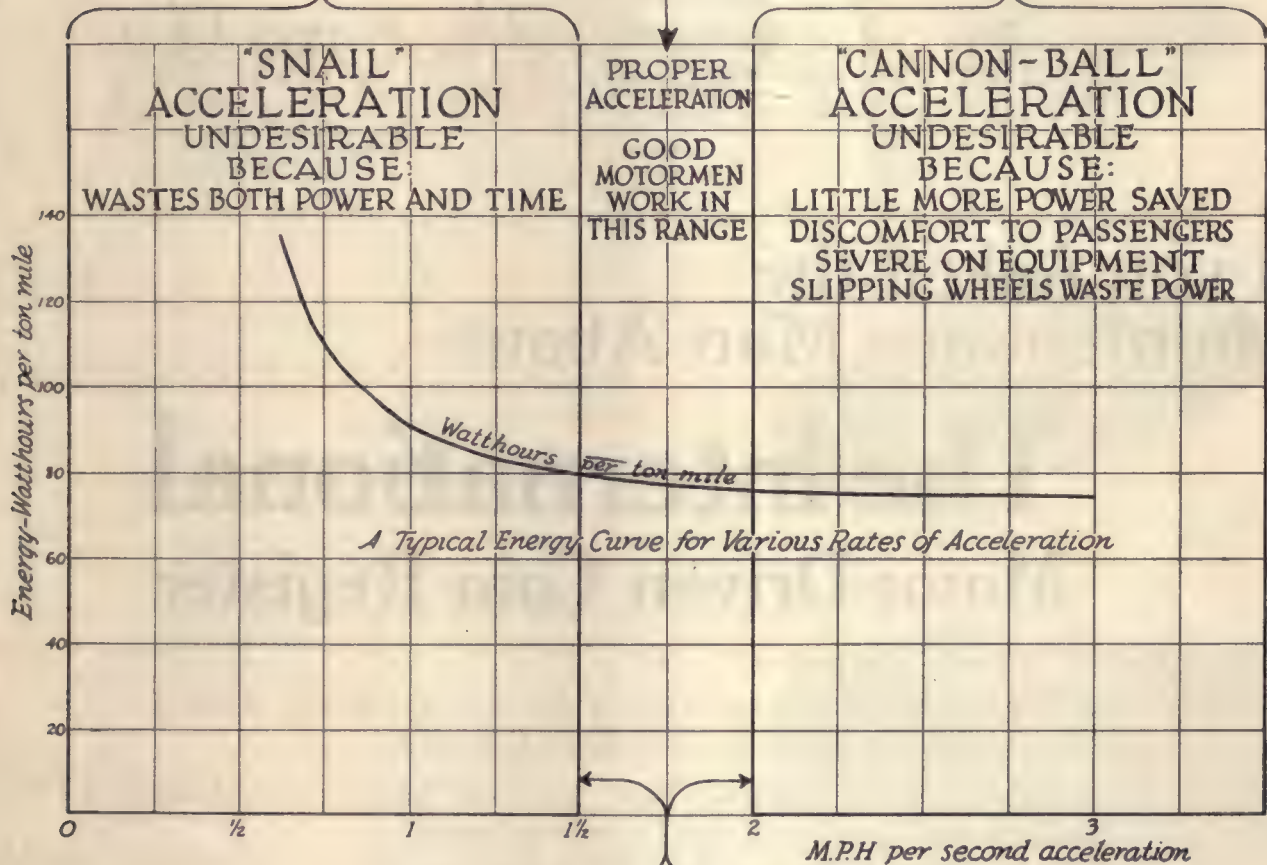
## OHMER FARE REGISTER COMPANY

Dayton, Ohio



# The Three Ranges of Acceleration

YOU DON'T WANT THESE RATES  
BUT  
YOU DO WANT THIS



Sangamo Economy Meters  
and the Sangamo Educational Campaign on your  
cars will put your motormen in this range  
*Ask for data*

**ECONOMY**  
  
**METERS**

**Sangamo Electric Company**  
Springfield, Illinois

Specialists in Meters for Every Electrical Need





If you Asked the  
Maintenance Man About

# The International Motor-Driven Coin Register

"Generally, we shop fellows get a scare every time a new batch of machinery is put on the cars.

"Well, you'd suppose that we'd be badly feazed on getting the International Coin Registers.

"Not a bit of it!

"We've been handling International clock registers for so many years that we knew anything the International bunch put out would be right mechanically, no matter how new.

"Why, if you'd see their factory testing room where they ring up each new register thousands of times, you'd get wise to why.

"We Don't Worry About International Coin Register Upkeep."

**THE INTERNATIONAL REGISTER COMPANY**

15 South Throop Street, Chicago, Ill.

Manufacturers of Coin Registers, Fare Boxes, Double and Single Car Registers and Fittings,  
Conductors' Punches and exclusive agents for Heeren Enamel Badges



# For Satisfactory Service—

## Wasson Bases

The Wasson Air Retrieving Trolley Base prevents expensive damage to overhead caused by wild trolley poles. In case of dewirement the base forces the pole to the roof, cushions it and locks it on the roof.

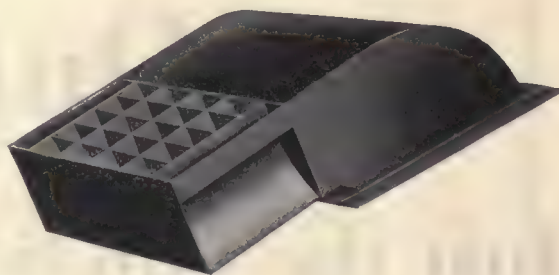
This base positively retrieves whether the pole is held by a rope or not. A sudden upward motion causes it to operate instantly. It can be placed on any car having air brakes. It offers also other superior advantages such as uniform tension on the wire regardless of height, roller bearings, better wiring through special work.



## Garland Ventilators

Make your passengers comfortable in well ventilated cars. The fact that there are more Garland ventilators today on railway cars than all other ventilating devices combined indicates their superior efficiency.

They are produced in several models for various classes of service. We illustrate here a honey-comb type for arch roof city cars. It is storm proof and will not admit side winds or rain. Service tests prove that Garland ventilators will pull the greatest amount of air from a car body—another reason for their extensive use on electric cars.



## Hartman Bearings

Reduce your wheel flange wear, rail wear and power consumption by using Perry-Hartman self centering center plates and anti-friction side bearings. They prevent binding between truck and body bolsters. Over 200,000 in use.

Hartman center plates have seven balls  $2\frac{1}{8}$  inches in diameter and carry weight over the entire surface. Consequently there is no pitting of raceways. No lubrication is necessary and there is nothing to wear out. Can be installed on almost any truck or body bolster. Send for details.



We Exhibit at Atlantic City

# Holden & White

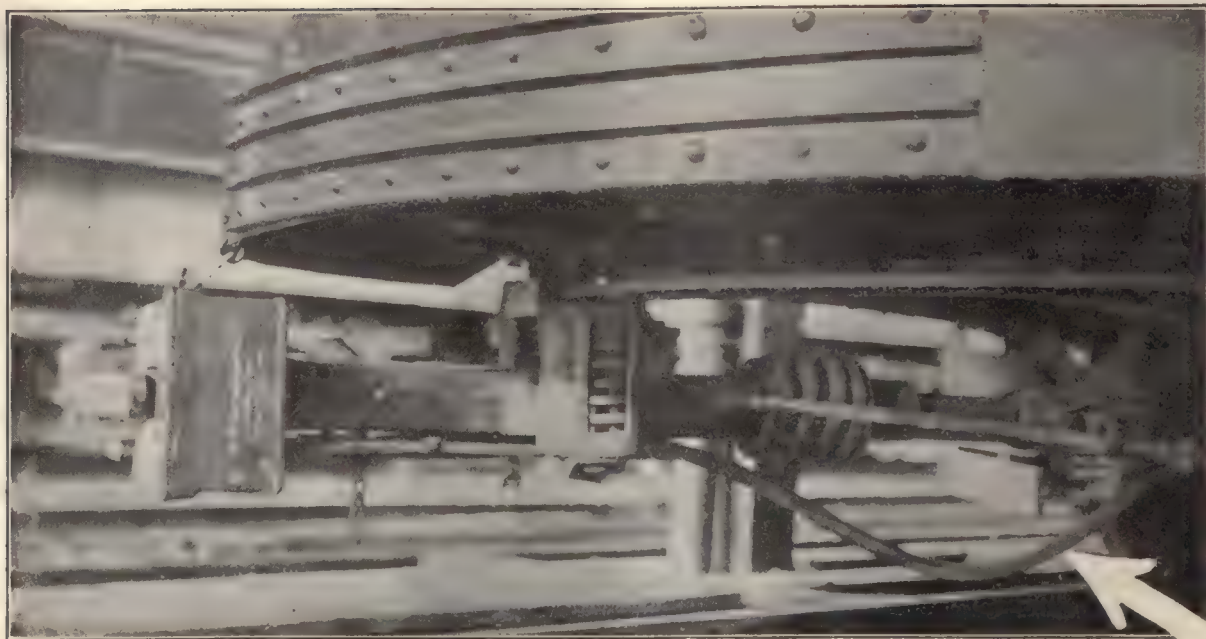
1508 Fisher Building

Electric Railways Sales Distributors

Chicago, Illinois

U. S. Metal & Mfg. Co., New York; C. F. Saenger & Co., Cleveland; Brown & Hall Supply Co., St. Louis; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Walles, Los Angeles; W. F. McKenney, Portland, Ore.





# Duraduct

Reg. U. S. Pat. Off.

## Just the Conduit for Trailers, Too!

Flexibility, of course, is a mighty good feature of Duraduct when you are carrying circuits from motor car to trailer.

Take the trailers of the Boston Elevated Railway, for example.

Fifty of them are being provided with Duraduct. Each car

takes 100 feet  $\frac{3}{4}$  inch, 75 feet  $\frac{1}{2}$  inch and 60 feet of the  $\frac{3}{8}$  inch size—making the net “lightness” 26.3 pounds.

You can't realize how easy it is to install Duraduct and how efficient it is until you've tried it yourself. Remember we send a

### Sample on Request

## TUBULAR WOVEN FABRIC CO.

MANUFACTURERS

### PAWTUCKET, R. I.

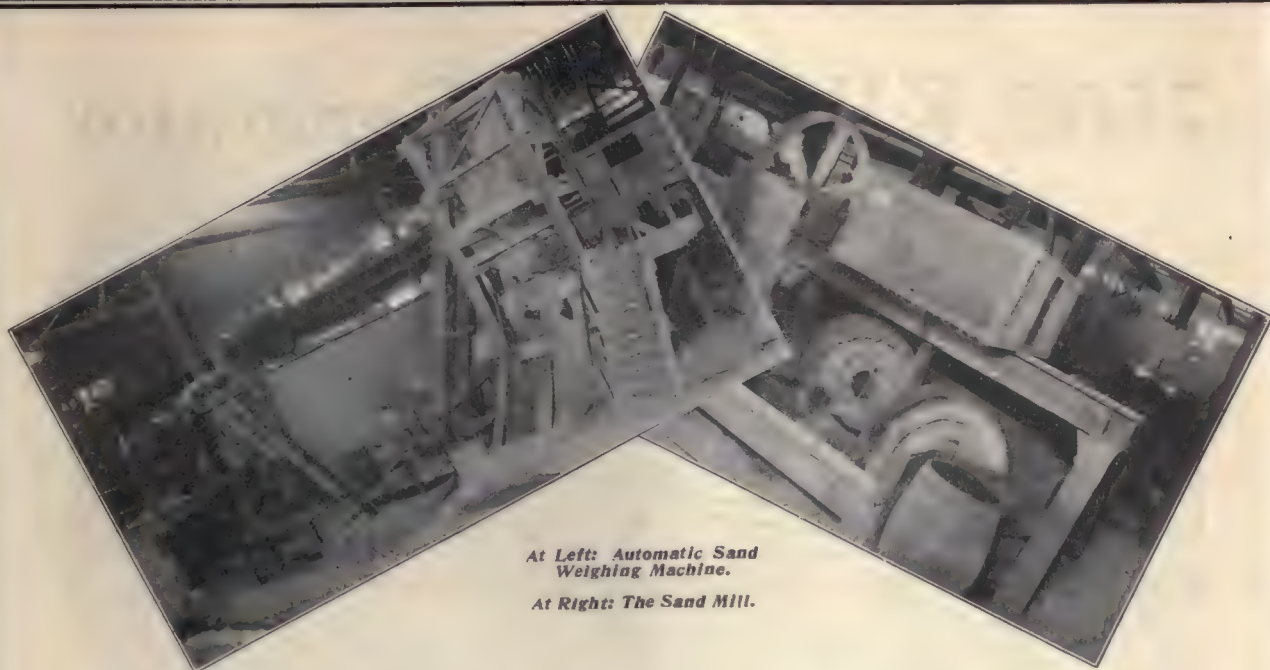
A. HALL BERRY, General Sales Agent

97 Warren Street, New York

9 South Clinton Street, Chicago

Distributors for Canada: NORTHERN ELECTRIC COMPANY, Ltd.





At Left: Automatic Sand Weighing Machine.

At Right: The Sand Mill.

## *Preparing the Sand for a Davis Steel Wheel Mold*

Absolute Accuracy in Quality, Proportions and Texture is Paramount.

In order to obtain a smooth, homogeneous casting, it is essential that the face of the mold which comes in contact with the metal be carefully prepared.

For facing Davis Wheel molds only *new* sand of recognized value is used. It first passes through a drying oven and thence to the hopper at the right where lumps are screened out. The sand then passes to the automatic weighing machine below, where the bonding materials are added and thoroughly mixed with the sand.

The carefully weighed mixture is placed in the sand mill, water is added and the action of the heavy rolls and plows produces a fine plastic facing material.

On first thought, molding sand may seem a relatively unimportant factor in the making of a steel wheel, and such precautions may seem over-refinements.

But think of the work a Davis Steel Wheel does and the dependence placed upon it. Mile after mile, year after year, it is subjected to the hardest kind of wear—constant friction, pounding over crossings and switches, and rounding curves. Thousands of lives and thousands of dollars' worth of property depend for their safety on the strength of car wheels. Davis Steel Wheels are unequalled for safety and dependability. This is due to their homogeneity of material and their resultant strength. Hence, it is easily seen that our extreme precaution in the preparation of the seemingly unimportant molding sand is more than justified by the results obtained.

When next you think of safety of car wheels in general, think particularly of the safety of Davis Steel Wheels.

### DAVIS STEEL WHEELS

The steel wheel with the one-wear tread.

No turning—no trouble with motor clearances.

A hard, tough manganese tread and flange.

A soft ductile steel plate and hub.

Reduction in slid-flats.

20% saving in weight.

Minimum maintenance cost.

Strength—safety—economy.

The steel wheel backed by years of successful service.

You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A.E.R.A. specifications and your service requirements.

Write.

# American Steel Foundries

1100 McCORMICK BUILDING

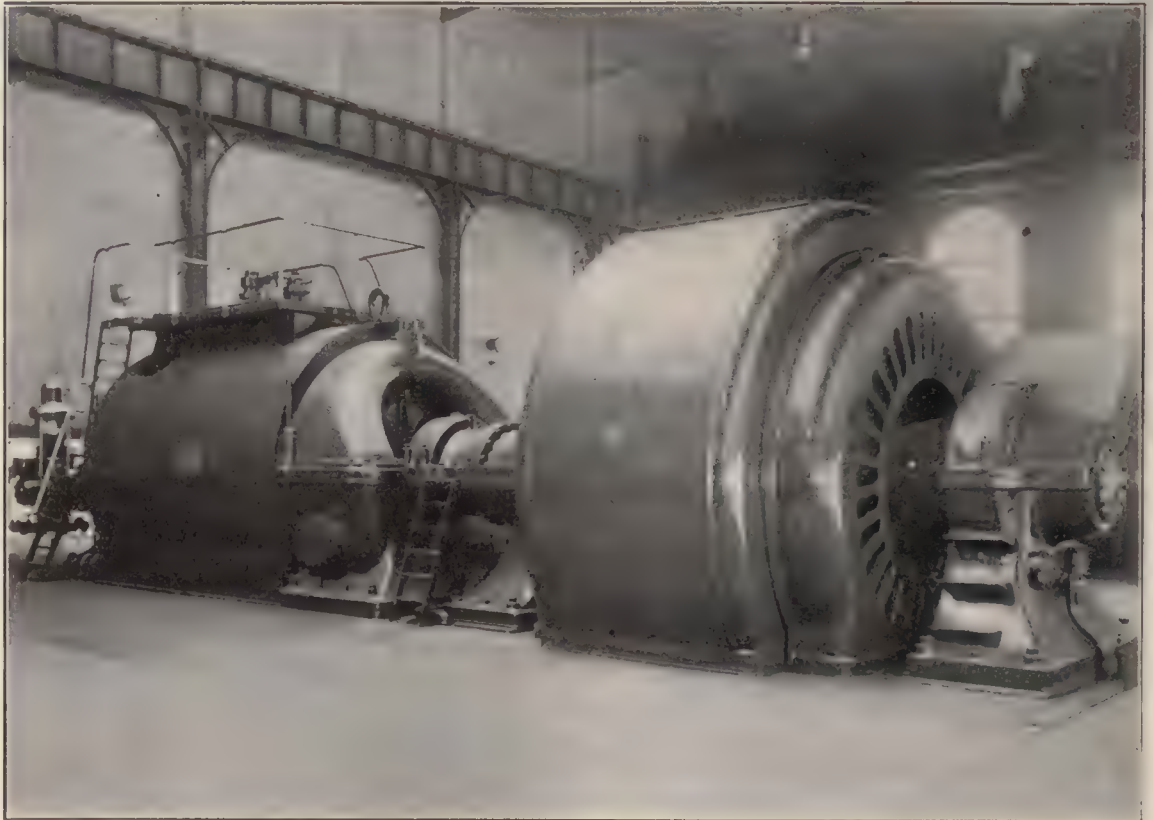
CHICAGO



# 7500 KW. Turbo-Generator

3 Phase, 25 Cycle

*For Immediate Shipment*



7500 Kw. Westinghouse-Parsons Turbo-Generator Unit, 3 Phase, 25 Cycle, 11000-12500 volts, 750 r.p.m., complete with Alberger Surface Condenser, Alberger Dry Vacuum Pump and Steam Driven Centrifugal Pump, etc.

This generator can be changed to any standard voltage.

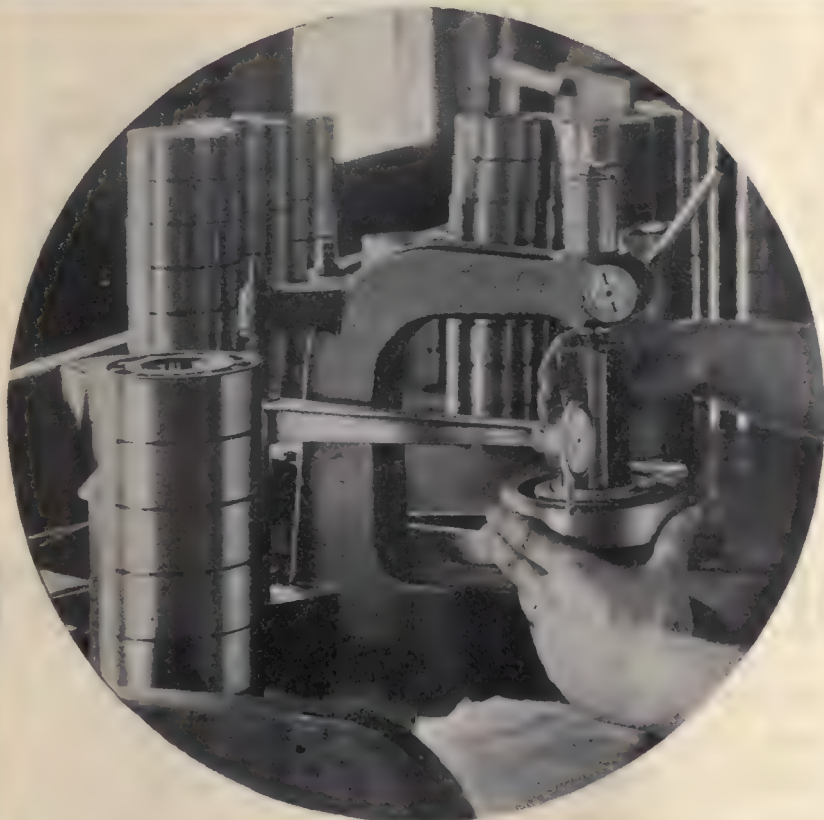
*If interested, please send for  
detailed specifications*

**MACGOVERN AND COMPANY, INC.**

114 Liberty Street

New York City





## Plain Bearings Do Not Stay Smooth

In spite of the most careful finish that can be given them.

Babbitt is very soft in comparison to the load a journal bearing has to carry.

The retention of its original finish, no matter how good, is entirely dependent upon a film of oil. Experience has shown that this film of oil is frequently forced out, thus destroying the fine finish and, in consequence, its efficiency.

Therefore the coefficient of friction of a plain journal, high to begin with, rises rapidly with use.

### The advantages of Hess-Bright Ball Bearing Journals

increase with time. The substitution of rolling for sliding, maintained by the design, quality of material and workmanship insures that their low coefficient of friction will be maintained for years while the plain bearing is wasting more power all the time.

*Hess-Bright Ball Bearings  
have proved their longevity*



## THE HESS-BRIGHT MANUFACTURING COMPANY

Front St. & Erie Ave., Philadelphia, Pa.

Hess-Bright Conrad Patents are Thoroughly Adjudicated



C. S. HAWLEY, President

CLAUDE C. NUCKOLS, Vice Pres. &amp; Gen'l Mgr.

W. S. HAMMOND, Jr., Vice President

THOMAS FARMER, Jr., Vice President

MONCURE C. CARPENDER,

Treasurer

## CONSOLIDATED CAR-HEATING COMPANY

Factories  
ALBANY,  
New York.  
COATICOOK,  
Canada

HEATING BY VAPOR AND DIRECT STEAM  
ELECTRIC CAR HEATERS THERMOSTATIC CONTROL  
STEAM COUPLERS PNEUMATIC CAR DOOR OPERATORS  
CAR STARTING AND STOPPING SIGNALS  
SPECIAL RESISTANCES.

Offices  
NEW YORK,  
Singer Tower  
CHICAGO,  
Fisher Bldg.  
ALBANY, N. Y.  
413-423 North Pearl Street  
LONDON, ENG.  
48 Milton St.

ALBANY, N. Y., September 27th, 1916.

# NOTICE OF INFRINGEMENT

The ELECTRIC HEATERS made and sold by this Company are PATENTED by the United States Letters Patent Nos.

744974, 746128, and 959872. These PATENTS are now owned by this Company, and vest in it the exclusive right to make, use, and sell such heaters. The Company's exclusive rights under these patents have long been acquiesced in by the trade and are considered of great value, and any and all makers, users, or vendors of heaters made in infringement of these patents will be liable to suit for injunction and for damages and profits.

Users of ELECTRIC HEATERS are warned not to buy heaters embodying the inventions of these patents from anyone except the CONSOLIDATED CAR-HEATING COMPANY, or its duly authorized agents, who are prepared to supply promptly the demands of the trade for these patented heaters.

Specific notice and warning are given to the trade that the electric heaters now being made and offered for sale by another manufacturer are considered to be made in infringement of these patents, and a suit has been brought and is now pending against that manufacturer for infringement of these patents. Purchasers of ELECTRIC HEATERS made by that manufacturer are liable to suits for infringement and damages.

## CONSOLIDATED CAR-HEATING COMPANY

ALBANY

NEW YORK

CHICAGO





The Tilting Angle of a Differential Electric Dumping Car May Be Held Indefinitely

The solid and substantial construction of the Differential Electric Dumping Car makes it suitable for carrying anything.

In the accompanying view a Differential is shown on a trestle over the coal storage of the East Liverpool Traction & Light Company.

Note that the loaded bins could remain tilted at any angle indefinitely without affecting the stable equilibrium of the car.

As a matter of fact, the tilting body moves

# See!!!

## Exhibit No. 500

# Differential Electric Dumping Car

about 3 ft. to either side of the car before the dumping doors are automatically released.

Furthermore, the balance is unaffected by any condition of unequal loading in the three sections of the tilting body.

Finally, **one man** manipulating one electric controller can tilt, right or hold the car at any angle.

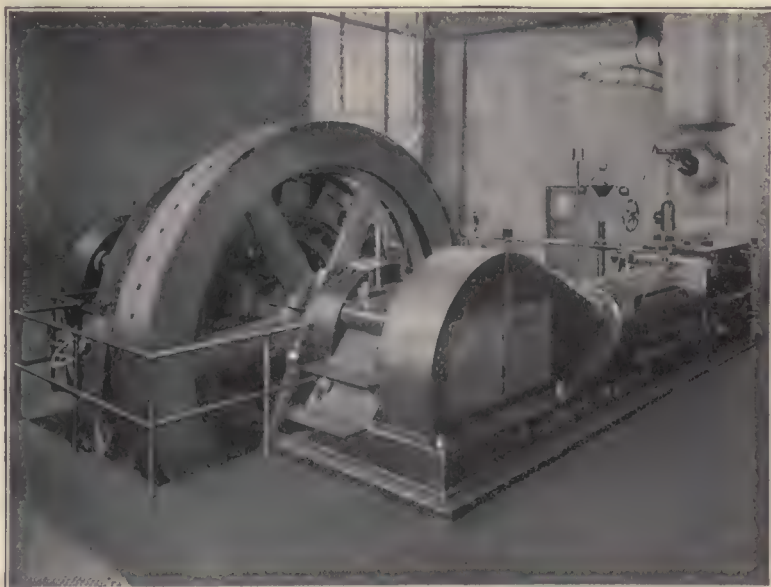
No other car is so **safe** and **simple**. How many do you want this Spring?

General Offices:

**Differential Car Co., Inc.** H. Fort Flowers Pres. & Gen. Manager **141 Broadway, N. Y.**  
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**WE HAVE BUILT  
6,000,000 HORSE POWER  
STEAM ENGINES  
GAS ENGINES  
OIL ENGINES**

We also build  
Steam Turbine  
Condensers  
Generators  
Motors, Etc.

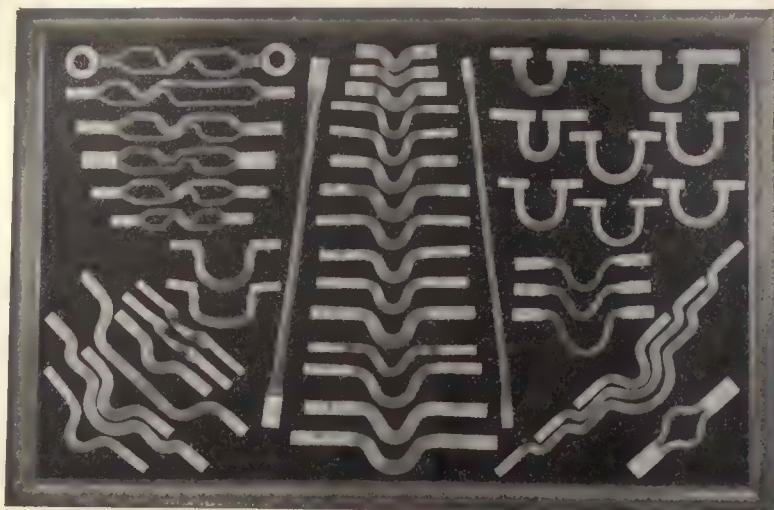


Cross-Compound Direct-Connected Corliss Engine Unit.

*Our 40 years' experience is at your service*

**ALLIS-CHALMERS MANUFACTURING CO.**  
**MILWAUKEE, WIS., U. S. A.**





## There is no Shortage of ERICO WELDED BONDS

Just as the Erico Bond is making good its promises of service, so the organization behind the Erico Bond is making good its promises of delivery.

There is no shortage of Erico Bonds, despite the fact that thus far 1916 has been the best of the 16 years of Erico success.

**Dependable Bonds—Prompt deliveries**

**The Electric Railway Improvement Co.**  
Cleveland, Ohio

# IF YOU WANT PROOFS

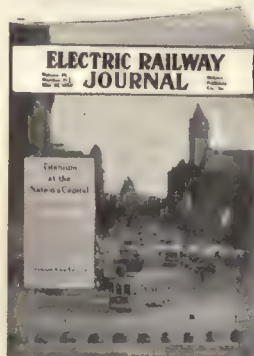
of your advertisements, and time to return them with corrections

**Copy Must Be in Our Hands Two Weeks  
in Advance of Publication Date**

**Copy Changes.** If no proofs are desired your advertisements should be in our hands Wednesday of the week preceding date of publication, otherwise your latest advertisement in accordance with schedule will be repeated.

**New Advertisements** (not changes of copy) can usually be accepted up to noon Wednesday of the week of publication, but no guarantee can be given as to location or proofs or indexing.

**Searchlight Advertisements** (Proposals, Wants, For Sale, etc.) received as late as 10 A. M. Thursday will be published if there is space available in the pages that go to press last. The paper is dated and mailed Saturday.



**T**HESE are not arbitrary rules. We do our best to give our advertisers what they want—work overtime if necessary—but each advertising form has to be on the press at a specified time. That is why we cannot guarantee proof or location unless we have copy on time. We want our advertising space to work at maximum efficiency for our advertisers.

**The Paper is dated and mailed Saturday**

**Electric Railway Journal, 239 W. 39th St., New York**



# Peter Smith Has Put Fresh Air in 9000 Cars!



Yes, there are really more than 9000 cars today equipped with the Peter Smith Hot-Air Forced Ventilation Heater.

They've been on the market six years—that's fifteen hundred a year—and going stronger all the time.

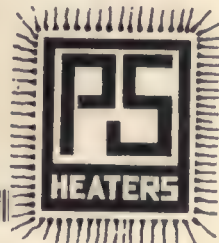
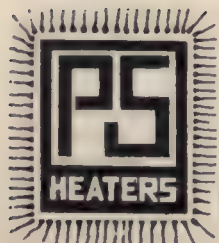
The Peter Smith Hot-Air Forced Ventilation Heater solved the problem of supplying to every part of the car warm air that was fresh.

The Peter Smith combination of stove, blower and distributing ducts is one of the best ever invented to foster better relations with your passengers and net earnings.

Just page Cleveland, Detroit, Calgary, Milwaukee, St. Louis, Syracuse, Sioux City, Des Moines, Edmonton, Winnipeg, Toledo, Toronto or scores of other cities!

**The Peter Smith Heater Co.**  
Detroit, Mich.

Heater Specialists for Thirty-five Years







# All Roads Lead to the Convention

Railroad men at the American Electric Railway Convention will have an excellent opportunity to inspect at close quarters

## G-E Line Material

in the General Electric Company's exhibit.

Specimens of material used in the world's largest electrification projects and on the most prominent roads in this country and abroad will be on exhibition.

Don't miss the G-E exhibit

# General Electric Company

Atlanta, Ga.  
Baltimore, Md.  
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Boston, Mass.  
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Chicago, Ill.  
Cincinnati, Ohio

Cleveland, Ohio  
Columbus, Ohio  
Dayton, Ohio  
Denver, Colo.  
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Schenectady, N. Y.  
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Toledo, Ohio  
Washington, D. C.  
Youngstown, Ohio

For Michigan Business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



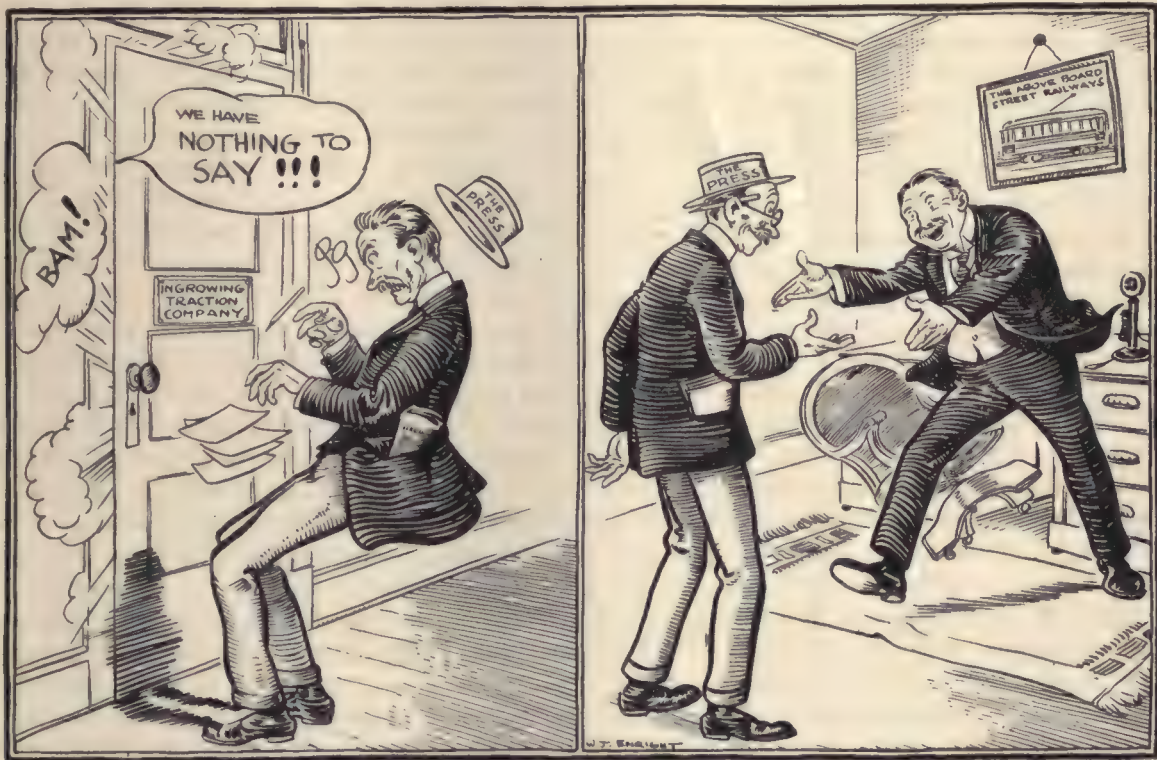
# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.  
Consolidation of STREET RAILWAY JOURNAL, AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, OCTOBER 7, 1916

No. 15



WHICH ONE OF THESE COMPANIES IS LIKELY TO BE BEST UNDERSTOOD

## The Open Door *vs.* The Shut Mouth

People instinctively distrust what they do not understand.

The savage did not understand the sun and moon and so he made gods of them and exhausted his ingenuity in propitiating them.

Modern man is not so strong for propitiating; he is more likely to throw bricks at what he doesn't understand or what he comes to dislike by reason of misunderstanding.

To most people the working of an electric railway is a mystery.

They see a stream of nickels going into the concern which, usually, conducts its affairs behind closed doors.

There are stories afloat of dark deeds committed in times past behind those doors.

There is apparent reason for a lot of dissatisfaction with the service rendered by this concern.

People have been known to stand, holding on to straps, during the rush hours.

Indignation has been aroused by the fact that

6 cents worth of transportation has not been given for 5 cents, with a free transfer thrown in.

And when complaint is made the popular idea is that a marble-hearted official uses the complaint for lighting his 50-cent cigar.

And all this because the people on the outside can't see what is really going on inside.

Question: Whose fault is it?

Answer: The railways.

Question: What is the cure?

Answer: Turn the inside outside.

Let them see in; tell them what you are doing and why; what you are not doing and why not.

Make a reputation for efficiency and frankness instead of for crookedness and concealment.

If the inside of the railways is not turned outside by the railways, the turning will be done by others—they are already doing it in fact.

Beat them to it with a whole-hearted policy of publicity.

["When" "How" and "What With" are the subjects of future Talks on Publicity]



## THE "JOURNAL" AND THE CONVENTION

This issue of the ELECTRIC RAILWAY JOURNAL will first reach many of our readers at the Atlantic City convention, and to them this paper extends its best wishes for a most profitable gathering. In the next issue, that of Oct. 14, the report of the convention will be published. The JOURNAL this year, as last, will not publish a daily report of the convention proceedings. Instead the papers and discussions of each association will be grouped together in the report issue of Oct. 14, forming a complete story of each series of meetings. A small daily will be published during the convention simply to give prompt publicity to official announcements and other material of immediate but transient interest. The report issue will, we hope, not only accurately record the ideas expressed by the speakers at the meetings and the progress made by the industry as epitomized in the committee reports, but will convey to its readers everywhere the spirit and enthusiasm of the convention.

## CONCLUSION OF THE NEW YORK STRIKE

The New York strike has now passed into history, and the results are the subject of congratulation to the railway companies, their employees and the public not only in New York City but also in every other city in the country. Employees of electric railway companies can now feel more safe in their jobs from outside interference, and the companies and the public are more assured of freedom in transportation. Too much credit cannot be given to the New York managers for the stand which they took and for the public relations work which had laid the basis for a proper general understanding of their position. In Brooklyn also, a most notable demonstration of loyalty was shown. This found expression in a mass meeting of employees held last Saturday night when mutual felicitations were exchanged between officers and men over the outcome on the B. R. T. The keynote struck was that both officers and men had confidence in each other, and that under the company's organization of departmental trustees, just as in the case of the Interborough and New York Railways internal brotherhoods, both sides can settle any possible points before they can give friction.

## CODIFYING CLAIMS ETHICS

Again the Pittsburgh (Pa.) Railways has made an important advance in its efforts to free modern claim work from the prejudice and suspicion inherited from the old "strong-arm" days in the electric railway industry. In a "Code of Ethics and Policies" that has just been compiled, as noted elsewhere in this issue, this company has with most commendable frankness stated the ethical principles, general policies and mode of procedure to be followed by it in the handling of claims. The present advance made by the company lies not in the fact that the code constitutes any new development, for it is simply a permanent collation of the fundamental principles that have been used by the Associated Bureaus of the company under the guidance of Cecil G. Rice. It comes rather because the company has thus

dared openly and officially to state, for the benefit of all parties concerned, its exact position in claim matters. The act is decidedly worthy of emulation. If the practices followed are just and fair, there is every reason for letting the public know what they are.

## ELECTRIC RAILWAY POWER SUPPLY IN ST. LOUIS

Those electric railway executives whose interests require them to follow the power supply question closely can with profit focus their attention on the interesting situation outlined in the special report of the directors of the United Railways of St. Louis abstracted in our issue for Sept. 23, page 531. Briefly, these are the facts: (1) The railway is buying approximately 60 per cent of its required electrical energy from the company which locally distributes Keokuk power on the basis of a 60 per cent load factor and at a cost of slightly less than 0.6 cent per kilowatt-hour. This energy is purchased on a long-time contract. (2) An additional 30 per cent or more comes at present from the local light and power company, this being on a 45 per cent load factor basis and costing about 0.84 cent per kilowatt-hour. The contract for this power is temporary, expiring in 1919, having been drawn to provide for the uncertainties attending the inauguration of the Mississippi River Power Company project. It provides for an annual fixed charge of \$15 per kilowatt and a secondary charge of 0.45 cent per kilowatt-hour. (3) The rest of the energy is supplied from the company's own steam plants, now antiquated, at a cost of at least 1 cent per kilowatt-hour. It is estimated further that by enlarging and renovating these steam plants, energy could be produced at 0.8 cent, or in a new plant that the cost would be 0.6 cent. The question is now whether the company should put up a modern steam plant to supplement the Keokuk hydraulic power or should provide for a gradually increasing supply from the local central power company.

The circumstances seem to indicate the advisability of the latter, for the same reasons that have dictated the combination of lighting and railway power plants elsewhere. These are, briefly, that the peaks of the railway load do not coincide with those of the lighting and power load, so that it would not be necessary to add as much generating equipment in the power company's stations to care for the railway load as would be needed in a separate plant. Again, there is economy due to the lower real estate, operating, maintenance and overhead cost per kilowatt, which naturally results from concentration of generating capacity.

The reader has already raised the mental question: "Why not take more Keokuk power since it is so cheap?" The answer is simple: Probably no more could be obtained at the price, an exceptionally low one secured because the hydraulic power company was desirous at the start of securing a foundation load of size and permanence. But even if it could be secured at the present price per horsepower-year it does not follow that the additional energy drawn would be cheap per kilowatt-hour, because it requires a high load factor to insure such a condition.



### PACIFIC COAST DEMANDS QUICKER SERVICE

The officials of practically every electric railway on the Pacific Coast are casting about diligently for some means of economically giving a quicker service that will put the street car more nearly on the plane of the automobile in point of rapid transit. Many companies are experimenting with "one-man" cars, some are operating auto bus and jitney lines as feeders, and every possible solution of the problem is receiving careful consideration. The seriousness of the situation growing out of the competition of the jitney and private automobile can best be judged by the statement that the earnings of the six largest companies in the five chief coast cities are falling below normal by from \$500,000 to \$1,000,000 each per annum, the greater part of the loss being attributed to this condition.

A manager of a company in the Northwest recently stated that the present problem is more difficult than the one faced when electric traction first appeared and it became necessary to change over from cable to electric drive. When that change was made, much experimenting was done, the public was patient with slow progress and the railways did the pioneering. In the present situation the evolution has been very rapid and has been fostered by competition. Jitney operation has not been on a feasible, business-like basis, it is true, but it has developed a popular demand for more speedy service and inclined the public to impatience with the old operating schedules.

This would seem to put the present state of affairs in a discouraging light, but there are hopeful signs in sight. With the realization of what the jitney is doing in the transportation field, the public is coming to recognize the obligations and responsibilities which it must assume, and regulation is slowly but surely following. News also comes from the Pacific Coast of the proposed formation of a jitney operating corporation, holding franchises and having an ultimate capitalization of \$100,000. If this is an indication that the "here to-day, gone to-morrow" irresponsibles will soon be out of the way, competition will be short and decisive. When the time comes that the jitney is bearing its proper burden and is under adequate regulation, the best and most economical public transportation agency will ultimately win, and that is undoubtedly the electric railway.

It is manifest, however, that the electric railway must adapt itself to such changes in conditions as may have been brought about by automobile competition. A representative of this journal has just completed a trip along the Pacific Coast and has found practically unanimous agreement that the most promising direction to work is with some form of lighter weight equipment. In both Seattle and Portland recent experiments with light-weight "one-man" cars have been so satisfactory, even on busy lines, that this idea is being developed further at once. In southern California, experiments with gasoline-driven cars have been made at several points; one of the results of these is the Fadgl flexible car used on the local systems in Fresno and San José, as described in the issue of Aug. 19. It is the feeling on

the Pacific Coast that Eastern interests have not fully recognized the difficulties which the Western roads are facing, and it is the hope of the Western roads that one of the results of the interchange of ideas at the Atlantic City convention will be some constructive, practical suggestions that will be a real help to them in the solution of the quicker service problem.

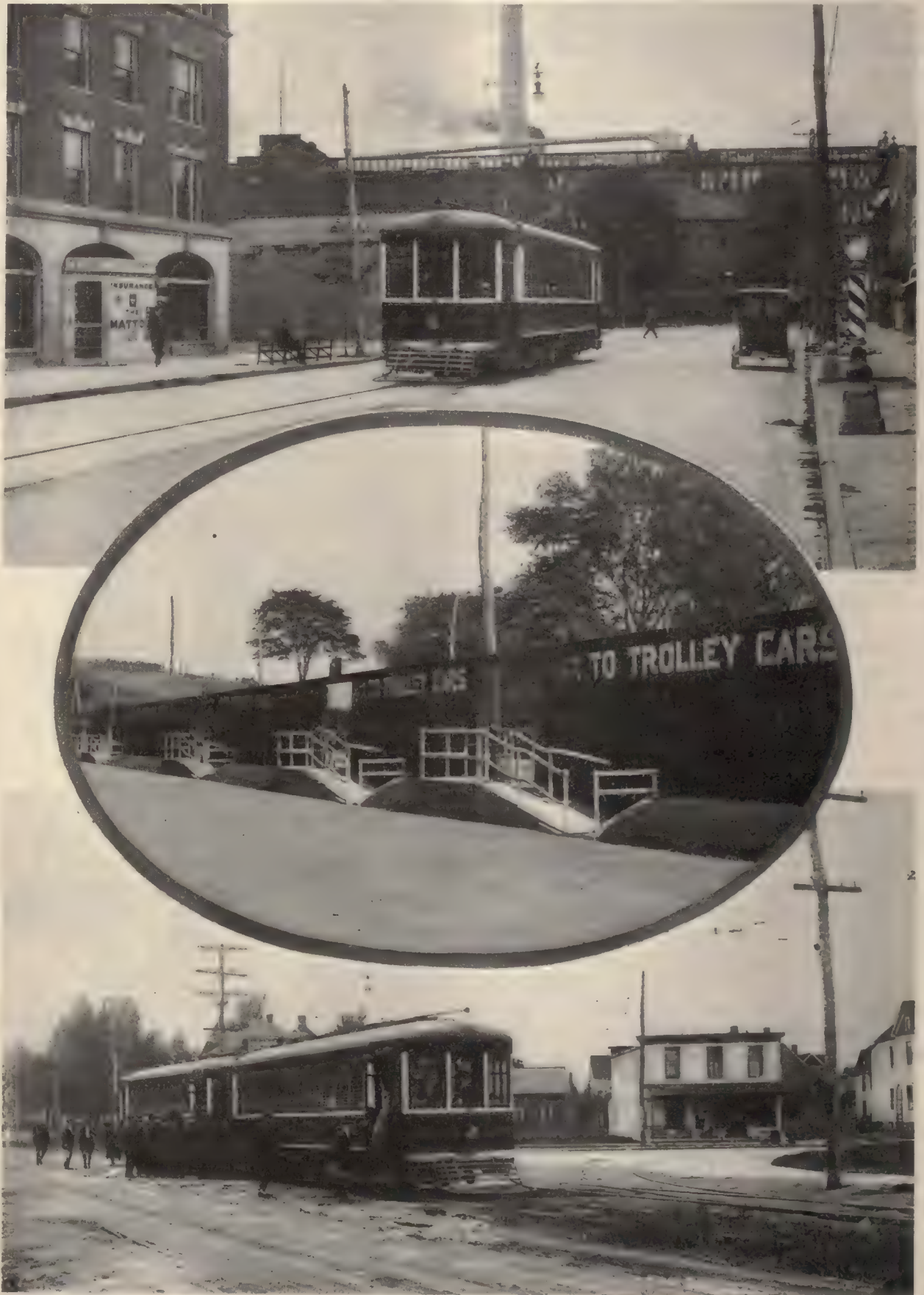
### CONTRACTS WITH EMPLOYEES

The many references, mostly vague or incorrect, which daily newspapers in New York and elsewhere recently made concerning individual agreements used for electric railway employees in Indianapolis, led us last week to prepare a digest of the facts relative to such contracts. The history of the so-called Indianapolis precedent shows that in 1914, after an arbitration award under a three-year peace settlement, the Indianapolis Traction & Terminal Company circulated individual working agreements in order to remedy a few impracticable working conditions in the award. In the major matters of not recognizing the union, maintaining an open shop and providing against strikes through the use of arbitration, the individual contracts simply echoed provisions of the arbitration award, and the permanent arbitration board deemed them not inconsistent therewith. When later the leaders of the Amalgamated Association tried to force the cancellation of the contracts, they were restricted by the courts from interference on the ground of being strangers thereto.

It is academic to discuss what legal action might have resulted in New York had there been in force on the Interborough Rapid Transit Company a formal settlement plan and arbitration agreement as in Indianapolis. It seems worth while to note, however, that the courts will evidently uphold utilities and their employees in their right to make individual contracts, and will not permit disinterested third parties to bring about a breach of such contracts. Furthermore, individual agreements make it easier to proceed in civil action against employees in the case of an unlawful suspension of work.

Another suggestion is that of Henry R. Towne and approved by the Merchants' Association of New York, as stated last week, that a general contractual relationship be established by law for the employees of all utilities. Under this plan the tenure of service would be so regulated by federal and state enactment that everyone voluntarily accepting utility employment would be obligated by contract to continue therein for a specified time, with proper provisions for the punishment of violations as well as for an honorable release from the contract for valid cause. The plan would permit union membership, but would prohibit concerted action to suspend service and would settle disputed wage and working questions by arbitration. The utility companies can profitably make a study of this bill, especially as the Merchants' Association of New York thinks so well of it that it has asked the Chamber of Commerce of the United States to take a referendum of its members upon its provisions.





Suburban Type of Car Used on  
Endicott-Union Line

East Gates with Turnstiles and Fare Boxes  
for Handling Baseball Crowds

Two-Car Train Loading at Terminus  
of Suburban Line

**Binghamton Traffic—Typical Views on the Lines of the Binghamton (N. Y.) Railway**





BINGHAMTON TRAFFIC—VIEW ON SUBURBAN LINE ALONG SUSQUEHANNA RIVER

## Rehabilitating Railway Receipts

In the Face of the Situation in the Last Two Years the Binghamton (N. Y.) Railway Has Reached the Strongest Position in Its Recent History Through the Introduction of Energetic Methods of Stimulating Receipts and Improving Operating Conditions

**A**S an example of the opportunities that are still latent in the electric railway industry, the recent record of the Binghamton (N. Y.) Railway has peculiarly timely interest. The situation that this property faced in the summer of 1914 was apparently typical of that confronting the industry as a whole, but since that date the introduction of new operating methods has placed the property on the strongest income-producing basis in its history, and the results constitute good evidence that the transportation field is still fallow. During the past two years the company's business has undergone a complete revival. Its net revenues each month are consistently showing increases of more than 15 per cent over the previous year's figures, and its gross revenues are growing steadily as the "riding habit" is developed among the city's population.

These improved conditions are represented in the accompanying graph, which shows, for the last seven years, the total annual figures for gross receipts. From this it will be seen that up to December, 1912, the gross receipts had maintained a regular annual increase, such as might be expected in any normally-growing city of moderate size. During the year 1913, however, there was a distinct falling off in the rate of increase, and this, coupled with a marked increase in car-miles, and also an increase in car-hours, produced a sharp decline in operating income.

During the year 1914, however, subsequent to its purchase by the Scranton & Binghamton Railroad Company, the property came to be operated under an entirely new policy. A change in management took place

during August, 1914, and there was immediately inaugurated a vigorous campaign of development of the unexploited sources of railway income. The result of this was a marked increase both in gross and net receipts, even for the year ended Dec. 31, 1914, or after less than six months of operation under the new methods. During this period the car-mileage increased slightly, but the car-hours displayed hardly any increase, resulting in a change from 8.3 car-miles per car-hour in the year 1913 to a figure of 8.7 car-miles per car-hour during 1914. The increased schedule speed was maintained during the year 1915, giving a figure of 8.6 car-miles per car-hour. An increase of 25 per cent in operating income for the year 1915 over the previous year took place despite the fact that a practically complete overhauling of rolling stock, track and line was going on during the whole period, all of the old equipment that has been retained in service receiving extra heavy repairs to place it in a condition as good as new.

Briefly speaking, these results have been brought about by the introduction of a faster and more regular service, short headways on the shorter runs, and a consistent effort to meet, and if possible to anticipate, the patrons' needs. That the latter policy has produced results is perhaps best demonstrated by the following reproduction of a resolution which was passed at a popular mass meeting and published in the local newspapers, and which, in this day of suspicion and controversy between the public and local utilities, can be characterized only as extraordinary:

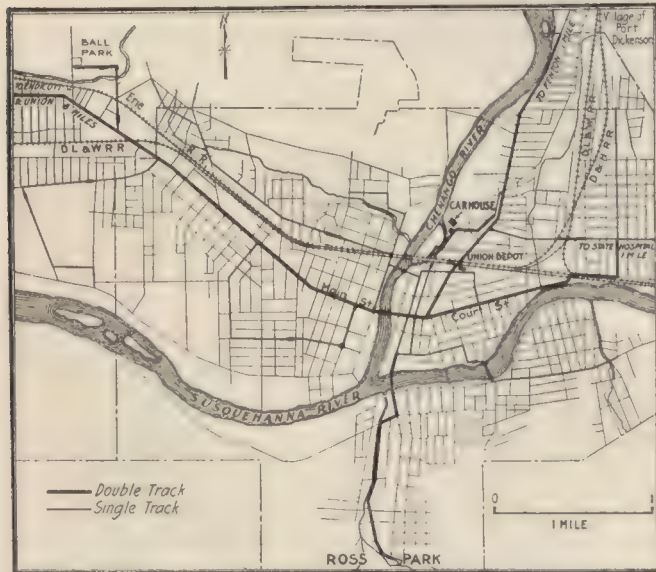


"At a meeting of taxpayers and street car patrons at Port Dickinson on Dec. 21, 1915, the following resolution was unanimously adopted: *Whereas*, the Binghamton Railway Company having improved and extended in a most satisfactory manner its roadbed in the village of Port Dickinson, and promptly provided a new schedule with modern pay-as-you-enter cars, faster running time, etc.; *Resolved*, that we herein express our appreciation of same, and desire to state that we wish to co-operate as best we may with the present and future plans of the railroad company.

[Signed] H. D. HARRIS, *Chairman.*  
E. E. LANTIMAN, *Clerk.*"

In the company's recent record the increase in gross receipts is, of course, the most interesting feature, because the new business has been in no way due to the receipt of war orders by the local manufacturers, the industries of the city of Binghamton being confined practically to the manufacture of shoes and cigars. From the accompanying map it will be seen that the center of the city lies in the peninsular formed by the junction of the Chenango and Susquehanna Rivers. About this section the city and its suburban towns straggle irregularly. The population of the city itself is about 55,000, but the electric railway system serves several other towns outside of these city limits, which increase the number of possible riders by about 25 per cent. However, a large part of the population of the city is collected in residential districts surrounding the business center at a radius of about 1½ miles.

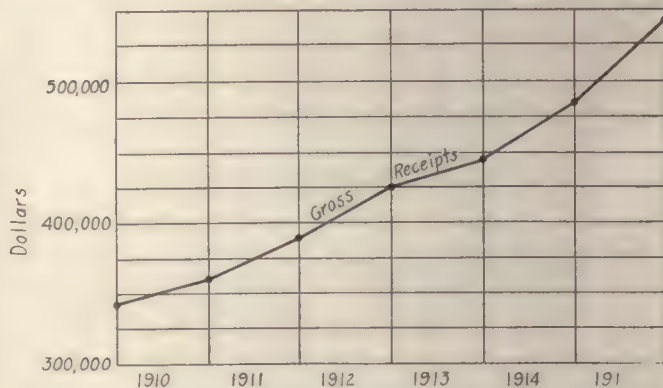
It was this source of revenue that the company sought first to develop. Owing to the fact that, practically without exception, these districts were little more than a mile from the business section, almost all of the residents could walk from their homes to the city within a reasonable time, yet, from the standpoint of the railway management, the short-haul traffic that they could bring to the company was most desirable. The first step to-



BINGHAMTON TRAFFIC—MAP OF BINGHAMTON (N. Y.) RAILWAY LINES

ward this end was a complete rescheduling of the runs on the entire system. In this, all schedules were considered a whole so that they could be made to dovetail in together, and thus make the headways between cars that were near and within the business section regular and at short intervals. Also, on all of the short lines radiating from the business district the headways were very much decreased, so that the frequent service would encourage the use of the cars.

This was accomplished without increasing the number of cars in service, because under the original conditions all cars had been run into the center of the city and turned there for their return trips. Under the new scheme of operation the cars were run through the center of the city wherever possible, thus avoiding the waits that had occurred at the central terminal originally used. This plan, in fact, permitted the removal



BINGHAMTON TRAFFIC—GRAPHIC RECORD OF GROSS RECEIPTS FOR PAST SEVEN YEARS

of cars on several of the lines, even though the frequency of service was increased owing to the faster schedule speed and the elimination of delays in the center of the city. Again, on the trunk line that appears on the accompanying map running west from the city, there are operated cars which serve on four different runs to branch lines, and it was found that under the old conditions all four of these cars ran in a bunch at a fifteen-minute headway over the part of the trunk line that was near the city. In the rescheduling these runs were so planned that the cars moved over the trunk line at regular intervals of less than four minutes.

Time points were established on all of the lines, and these were rigidly adhered to, the arrangement of the points and the running times being worked out by having an expert motorman make runs over the line so as to determine from actual practice just what time could be made. This, alone, increased the schedule speed on all runs very materially. Subsequently, new rolling stock was purchased, as described in the *ELECTRIC RAILWAY JOURNAL* for Dec. 25, 1915, and this improved the schedules still further. An example of the extent of this change may be cited in the case of one line upon which the schedule speed with the old cars was increased 11 per cent, and when the new cars were placed in service the increase in speed rose to 17 per cent over that which had been in effect prior to the change.

Another circumstance which tended toward slow schedules under the old conditions was that the residents of the city had formed habits of deliberation in boarding and alighting from the cars. Frequently, as much as fifty seconds were consumed at a stop where passenger interchange normally should be completed in ten or fifteen seconds. This, of course, worked to the detriment of the running time, and to meet the situation signs requesting co-operation from the public were posted in the cars. These have produced excellent results not only in accelerating traffic but also in keeping the cars clean.

Again, on one of the lines—that extending northward from the city to the village of Port Dickinson—the schedule speed was increased by rebuilding the track and putting on new cars under a faster running time. The traffic over part of this line is fairly heavy, and in consequence a ten-minute headway was established





BINGHAMTON TRAFFIC—TYPE OF CAR ORIGINALLY USED AND NEW TYPE OF CITY CAR THAT DISPLACED IT

for about 2 miles north of the city. As the outlying sections of the line would not support such frequent service, the schedule was so arranged that the ten-minute headway on the inner section was made up with turn-back cars, a twenty-minute service being supplied for  $\frac{3}{4}$  mile beyond the first turn-back point and a forty-minute service being given to an outlying section about 1 mile beyond this. This turn-back scheme, together with the new cars and tracks, as well as new paving that was laid, gave very great popular satisfaction, while the ten-minute service near to the city served as a definite incentive to the short riders.

For the long rides, frequency of service was not considered so necessary, and on the suburban line between Binghamton and the towns of Union and Endicott, which lie about 9 miles west of the city, the original headway of fifteen minutes was increased to twenty minutes. But with the new service the schedule time for the run was reduced from fifty minutes to forty-five minutes. This permitted the handling of the traffic with one car less than was previously operated, and with the new cars and the faster schedules that were introduced the change met with the patrons' approval.

An incidental feature of the campaign for increased gross receipts consisted in the introduction of improved

fare collection methods. Prior to the change in management of the property, only about 12 per cent of the cars were of the prepayment type, and on none of these were fare boxes used. Fare boxes were, therefore, placed upon all cars, where this was possible, and were installed on all of the new cars purchased by the company. On some of the old cars with small platforms, where the use of fare boxes was impossible, Rooke registers were provided for the conductors, this plan being designed to protect them from misunderstandings under the close system of inspection that was also introduced.

By no means a small part of the recent success of the company has been due to its present popularity with the local residents. Probably the first step that was taken by the new management toward this end was the construction of a short line to serve a local baseball park, this being an extension over which there had been a long-standing dispute between the railway and the baseball fans, who constituted a large portion of the populace.

The extension, of course, is used very infrequently, and for no other purpose than for serving baseball crowds. In consequence, it really cannot pay, and this was the reason that had kept the railway from building it originally. It is provided with thoroughly modern



BINGHAMTON TRAFFIC—COURT STREET, BINGHAMTON'S MAIN THOROUGHFARE, WHERE CROSS-TOWN RUNS ORIGINALLY TERMINATED



terminal arrangements so that crowds can be handled without delay. Ramps, gates, turnstiles and recording fare boxes have been installed, and all fares are collected as passengers leave the grounds before they board the cars. The park, it may be said, had been donated by a prominent manufacturer of the city, and since the location which he chose was about 1800 ft. away from the then existing railway line, there was a very considerable popular demand for railway facilities to serve it, regardless of the question of profit or loss to the railway. When the extension was finally built the local press reported the construction with elaborate notices, and this definitely inaugurated an era of good feeling on the part of the public.

Subsequently, a particular point was made of calling upon prominent business men and discussing with them possibilities for improving the service in general. Through these interviews a number of excellent suggestions were received, and they were promptly put in force, leading other citizens to interest themselves in street railway matters. Eventually the public at large became interested and began to boost the railway company. Naturally, under the circumstances, some suggestions as to improvements were received without being adopted because of their impracticable nature, but whenever this was the case a special point was made to explain in detail the reasons why the suggestions could not be put into practice.

The most striking result of the popularity thus acquired by the railway came up in connection with the jitney-bus craze when it reached the city of Binghamton. The first attempt to operate jitneys came shortly after the extension had been made to the local baseball grounds, and the first jitneys were operated between the city and this park. As soon as this competition began, the attention of several of the influential citizens was called to the fact that the ballpark jitney runs would be only an entering wedge for jitney operation generally, and that, in consequence, it would be desirable to advocate publicly the patronage of the railway to the exclusion of the jitney buses. As a result, the competition died within a few weeks, even without the passage of any regulatory ordinance.

## 2000th Issue of London "Electrician"

Commemorative Number Contains Authoritative Articles Summarizing Progress in Electric Traction, Prime Movers and Other Divisions of Its Field

IN commemoration of the issuing of the 2000th weekly number of the *Electrician*, London, that journal on Sept. 15 published a special number largely taken up with retrospective articles covering the several divisions of the field of electrical engineering.

The article on electric traction, written by Dr. H. F. Parshall, covers the history of electric traction, in America particularly. The writer states that while the physical knowledge on which electrical engineering is founded is largely English in origin it is remarkable that so much of the actual development and application have been on American soil. He believes that the technical application of knowledge is most likely to attain rapid development in those countries where industries find the greatest protection and there is the greatest security afforded for capital invested in such industries.

The development of electric power stations was treated by P. C. Hunter and that of the steam boiler by D. Wilson. Mr. Hunter points out that the pioneers in steam power development worked along lines of im-

proving thermal efficiency, whereas during the last ten years engineers have been content to develop in the direction of improving the internal efficiency of the turbine and reducing its capital cost per kilowatt by the development of sets of increasing size and speed. The economical advantages obtained in this way have led to the cheaper production of electricity, increased sale and improved load factor, which in their turn have permitted the use of still larger turbines. He gives a graph showing the increase in load factor of electricity supply stations from less than 10 per cent in 1897 to 30 per cent in 1915.

Mr. Wilson traces the development of different types of boilers and shows the relation of increases in steam pressure to boiler design progress. Up to 1860 pressures did not show much increase and were lower than 40 lb. per square inch, but since that year the increasing pressure has been very rapid, assisting the development of the water-tube boiler. He states that during the past ten years there has been no fundamental change in water-tube boiler design. While types have varied the higher efficiency of the boiler to-day is due almost entirely to improvement in structural design and in the better assembly of the boiler house plant generally. These features he covers in considerable detail.

## Code of Ethics and Policies

Associated Bureaus of Pittsburgh Railways Issue Book Frankly Stating Position on Claims for Injuries and Damages

THE Associated Bureaus of the Pittsburgh (Pa.) Railways and its allied companies have prepared for public distribution and for their own use a book entitled "Code of Ethics and Policies," which gives in detail the position of the companies on matters arising out of the consideration of claims for injuries and damages. Thus another step toward the perfecting of modern claim work has been taken by these bureaus, whose work along clerical, litigation, adjustment, inspection, medical, safety and welfare lines was described in detail in the *ELECTRIC RAILWAY JOURNAL* of July 24 and Sept. 11, 1915.

According to an executive pronouncement by Cecil G. Rice, assistant to the president, who is in charge of the bureaus, the circumstances surrounding each particular accident readily distinguish it from all others, but the underlying principles which guide and control the attitude and action of the Associated Bureaus in connection with such occurrences are comparatively few. Moreover, the codification of these principles is said to offer such convincing proof of sincerity and fair dealing on the part of the company as may reasonably be expected to encourage and develop a reciprocal attitude from others. To make the official character of the code absolutely clear, it is stated by Mr. Rice at the beginning that only such action on the part of members of the Associated Bureaus as is in complete harmony with the spirit and the letter of the "Code of Ethics and Policies" will receive official approval.

The general position of the company in the matter of claim work is ably summarized in the "Foreword," as follows:

"The Associated Bureaus hold in great regard their high calling to be mediator between those who have fallen into suffering and misfortune by reason of accident, on the one hand, and the companies, in connection with whose properties that may have occurred, on the other. It is earnestly hoped that all such persons will retain in their attitude toward the Associated Bureaus a spirit of amicability and confidence. Toward



all such persons the Associated Bureaus will exercise a similar friendly regard in all of their dealings.

"All accidents and resultant injuries are as sincerely regretted by these companies as by those to whom they befall. It is then both harmful and erroneous to harbor a spirit of enmity or prejudice toward the companies, or the Associated Bureaus, solely because an accident has occurred. It is the desire and intention of the Associated Bureaus that such intercourse as may follow upon the occurrence of an accident shall result in increase of mutual respect and good understanding between all of the parties concerned.

"The Associated Bureaus hold as their high moral duty the prevention of accidents, both by anticipatory means and by searching inquiry into accidental occurrences. They seek to effect and maintain relations of fairness and good understanding between the companies and their patrons generally, and particularly with those persons who have sustained injury or material loss by accident in connection with the companies' properties, to the end that in these contingencies such action may be taken by the parties concerned as will be just, equitable and mutually satisfactory."

The first fundamentals stated by the code are the guiding principles and mode of procedure published in the issue of this journal of Sept. 11, 1915, page 437. To summarize these here, however, it may be said that the guiding principles concern the points of maximum accuracy, utmost expediency, absolute fairness, persistent courtesy, minimum consistent expenditures, and perfected co-operation and efficiency. Similarly, the mode of procedure involves the following acts: overcoming prejudice, inspiring confidence, analyzing and reducing to a business basis, creating a desire, causing a determination and satisfactorily closing the transaction. The code also includes ten "fundamental facts," as noted in the above-mentioned issue, which are suggested for the consideration of those who have been or may become involved in accidental occurrences. These facts have mostly to do with claims as a matter of business rather than law, and the reciprocal responsibilities of the public and the companies in handling such a business matter.

In regard to the medical profession, the code takes the point of view that the recognition by the company of the generous proficiency of doctors inspires a respect for their ethical tenets, and also the expectation of a reciprocal observance by them of other ethical procedure, *e.g.*, the general code for the Associated Bureaus. Moreover, the insistent belief that legal advice is unnecessary for the satisfactory disposition of business with the Associated Bureaus is not permitted to hinder full observance of the courteous consideration due to members of the bar. In a special chapter to members of the Associated Bureaus, they are told of the fiduciary relationship which they bear to the organization as a whole, and of their obligation to uphold its honor and dignity in speech and action.

In order to emphasize the main points brought out, the book at its end presents an "epigrammatic recapitulation," from which the following specimen sentences have been taken:

"The public, these companies and their employees form a community of interest, each having reciprocal rights and responsibilities.

"The voluntary adoption of a high standard of action is justification for expecting a corresponding attitude on the part of others.

"Only the one who seeks that to which he has no right can find excuse for objecting to the full details of an accidental occurrence being made known to the Associated Bureaus by those who know the facts.

"To advance the best interests of all concerned by recording details of an accidental occurrence one observes is a duty of citizenship involving no embarrassment or annoyance.

"The mere fact that a person sustains injury by no means warrants a request for compensatory damages.

"Justification for presenting a claim must be based upon the freedom from fault of the person injured and the causal negligence of the person from whom compensation is sought.

"A claim for damages is the same as a bill; it is an allegation of indebtedness susceptible of similar itemization and presentation.

"The unnecessary employment of another to represent one in so simple a matter as the presentation of a claim indicates business incompetency.

"If these companies owe they are not only willing but desirous of canceling the obligation.

"Only persons wanting too much, or something to which they have no right, now find excuse for litigation following accidental injury or damage.

"To discourage all unnecessary litigation is an economic duty of the public.

"Professional solicitors of claims for litigation are a public nuisance. To be solicited by them is a reflection on one's intelligence.

"A doctor whose advice is not for the best physical interest of his patient violates the ethics of his respected profession.

"An attorney who charges an exorbitant fee for collecting a simple bill for damages is dishonest and his client is foolish.

"Confidence begets confidence. The Associated Bureaus have confidence in the inherent reasonableness and honesty of the public."

## Kansas City Safety Campaign Under Way

The safety campaign of the Kansas City (Mo.) Railways is under way in all its phases. Following the first distribution of literature to the schools, essay contests are being arranged, and films are at hand for exhibitions in the schools equipped with projection rooms, and in moving picture theaters. The safety work within the company has also started, expanding safety work that has been done for several years. A general committee manages the entire campaign. This committee consists of E. B. Atchley, publicity agent; Kearney Wornall of the claim department, and J. H. Harvey, superintendent of efficiency. Working directly under this committee is W. S. Woodland, formerly a supervisor. He has been appointed special safety agent. The safety work within the railways organization is under the charge of a central safety committee, with James E. Gibson, general manager, as chairman, Mr. Woodland secretary, and the heads of departments as members. Each department also has its committee, and in each of them are sub-committees.

In the description of the Dallas, Tex., new interurban terminal in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 23, 1916, a typographical error made it appear that all of the interurban lines using the terminal are managed by the Stone & Webster Management Association. It should have read that the Northern Texas Traction Company is so managed, since the Southern Traction Company and the Texas Traction Company are under the Strickland management. The Dallas Interurban Terminal Association is also managed by the Stone & Webster Management Association.



**DARLOR CARS**

**Summer Time is Traction Time**

**Tickets punched - TRACTION Way**  
SAFETY COMFORT NO DELAY

**THE ECONOMICAL WAY TO ST. LOUIS**

**Your Way Any Hour Any Day**

**TRACTION RIVER EXCURSION**

**The Woods Are Calling You**  
The Traction System

**YOU REALLY SLEEP in Traction Sleepers**

**ITS Makes a hit with**  
THE ROAD OF GOOD SERVICE for Base Ball Fans

**TRACTION**

**LOW RATE to the State FAIR**

**ILLINOIS TRACTION SYSTEM**  
The Means of Good Service

## TRACTION-RIVER EXCURSION



VIA  
**ILLINOIS TRACTION SYSTEM**  
(McKINLEY LINES)

& STEAMER COLUMBIA to Henry, Ill.  
**\$1.00 ROUND TRIP**  
INCLUDING BOAT  
Sunday, July 30th

### SPECIAL TRAIN LEAVES

HARRISTOWN	7:00 A.M.	SPRINGFIELD	7:00 A.M.
NIANT	7:00 A.M.	SPRINGFIELD	7:00 A.M.
ITD GALLS	7:00 A.M.	SPRINGFIELD	7:00 A.M.
LANE-VILLE	7:00 A.M.	SPRINGFIELD	7:00 A.M.
MECHANISBURG	7:00 A.M.	SPRINGFIELD	7:00 A.M.
WHEEL	7:00 A.M.	SPRINGFIELD	7:00 A.M.

Returning Special Train Leaves Wheel at 7:30 P.M.

Tickets Good on Second Train Only

**FREE DANCING on BOAT**  
and **BASE BALL GAME at HENRY**  
**ROUND TRIPS \$1.00**  
INCLUDING BOAT RIDE

**The Road of Good Service**  
to  
**ILLINOIS STATE FAIR**  
**Your Way-Any Hour-Any Day**  
WHEN THE TICKET READS VIA  
**ILLINOIS TRACTION SYSTEM**  
(McKINLEY LINES)  
**LOW RATES—SPECIAL SERVICE**  
**SPRINGFIELD, ILLINOIS**  
**SEPTEMBER 15-23**

Illinois Traction System Publicity  
Newspaper Advertising Layouts and Posters Used in Advertising



# Illinois Traction System Uses Many Forms of Publicity

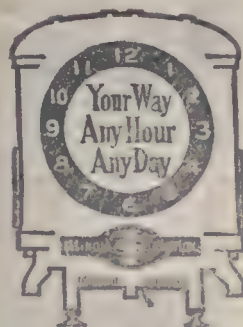
The Accompanying Illustrations Have Been Selected to Show the Several Phases of the Advertising Work Which Is Being Done by This Progressive Electric Railway System

THE department of publicity of the Illinois Traction System is kept busy constantly devising new and attractive ways of obtaining the public's attention. The various forms of publicity employed include newspaper advertising, posters, car cards, billboards, moving-picture slides, dodgers, postcards, playing cards, and paper napkins and fans for picnic parties. The department of publicity has made advertising contracts with approximately 200 weekly and daily newspapers in the towns and villages along its lines. Advertising copy is run when it is seasonable, and the amount varies with the different papers. In one of the accompanying illustrations are shown the various layout forms in which newspaper advertising appeared during the past year. Mats of these layouts were made for some newspapers and electrotypes were made for others, and the type matter was changed to suit the conditions existing in the different localities.

Newspaper advertising as well as publicity of all forms reaches its maximum just prior to the Illinois State Fair, which usually occurs in September. During the past two years the department of publicity has made it a special point to distribute the various forms of publicity in the territory served by the steam railroads which do not enter Springfield, Ill., the point where the

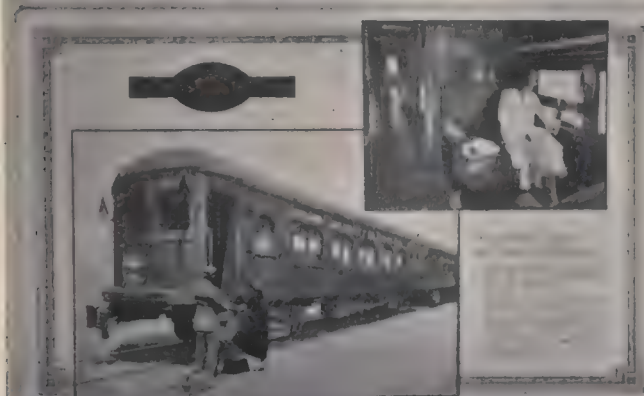
State fair is held. A considerable quantity of this advertising matter is distributed at the various county fairs held along these steam railroads, and during the present year either a representative of the company was sent or advertising matter was distributed at forty-six of these county fairs. This advertising sets forth the convenience of connecting with the Illinois Traction System trains at the various terminals, and the frequency, the safety and the comfortableness of the service.

In order to see that as many passengers as possible return from the State fair by way of the Illinois Traction System, a building has been erected on the fair grounds. This also serves as the official State fair bureau of information. The State fair association has a representative at this booth, as well as the Illinois



Parlor Car Service

IMPRINT ON PAPER NAPKIN  
GIVEN TO PICNIC PARTIES





**the BEST WAY to the BEST STATE FAIR**

LOW RATES SPECIAL SERVICE VIA  
**Illinois Traction System**

PEORIA  
Springfield, Sept. 15-23  
MACK  
LINCOLN  
SPRINGFIELD  
CARLINVILLE  
HILLSBORO  
STANTON  
E-ST. LOUIS  
MOON-INGTON (McKINLEY LINES)  
CLINTON  
CHAMPAIGN  
ODDEN  
DANVILLE  
URBANA  
BOWLER  
CARLIN  
STINE FARM

**CLIP THIS COUPON**

This Coupon when presented at the ILLINOIS TRACTION BUILDING on the State Fair grounds entitles the bearer to a free pocket railway map of Illinois.

ILLINOIS TRACTION SYSTEM PUBLICITY—HANDBILL ADVERTISING SPECIAL SERVICE TO STATE FAIR

Traction System, and information not only regarding the Illinois Traction System trains, but about all of the steam railroads and the fair itself is furnished upon inquiry. In connection with its newspaper advertising for the Illinois State Fair this year, the Illinois Traction System is offering to all those who will present a coupon, which appears in the advertisement, a souvenir consisting of a complete railroad map of Illinois showing the Illinois Traction System's lines printed in heavy red ink. Several of the various forms of publicity which are being used are shown in the accompanying illustrations.

This year a new set of illustrated postal cards was prepared by the department of publicity. These portray the sleeping and parlor cars, the freight trains, the McKinley electric bridge, the company's waiting station and substations, and the block signals. All ticket agents



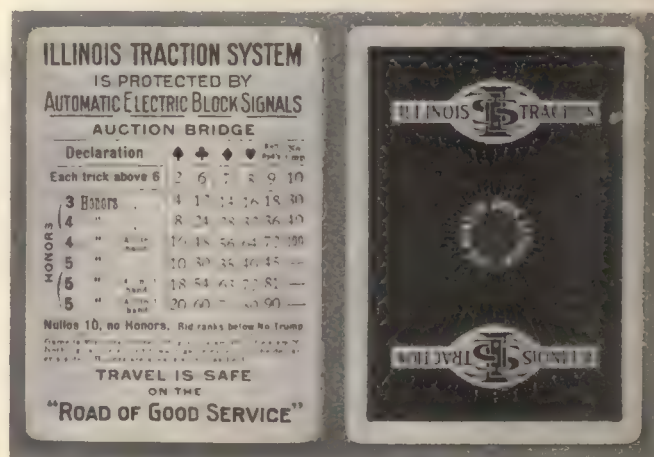
ILLINOIS TRACTION SYSTEM PUBLICITY—INFORMATION BUREAU AT STATE FAIR GROUNDS

are furnished with a supply of these postal cards, and the fact that they may be had upon inquiry is announced in advertisements and upon posters. These illustrated postal cards are also distributed at the county fairs, they are supplied to the steam railroad ticket agents, and they are placed in the Illinois Traction System's parlor and sleeping cars. The last edition of cards was printed in quantities of 10,000 of each kind. Several years ago there was a great demand for them, but since the picture postal-card fad has passed the present demand for them is not so great.

Playing cards of two qualities and especially designed are also purchased by the department of publicity and distributed by the passenger department. One pack of these cards, which is of a 25-cent quality, sells for 15 cents, and the other, which sells for 25 cents, is of a 50-cent quality. These cards are sold at cost by all the ticket agents, and frequently when there is a special car movement producing considerable revenue, playing cards are given free to the passengers. The fact



ILLINOIS TRACTION SYSTEM PUBLICITY—CAR CARD ADVERTISING SERVICE TO STATE FAIR



ILLINOIS TRACTION SYSTEM PUBLICITY—FACE OF EXTRA CARD AND BACK OF PLAYING CARD

that these playing cards are on sale at all passenger stations is advertised in the company's folder. There has been a large demand for them, because they are attractive and of excellent quality. Several extra cards are included in each deck, and on these is printed matter calling attention to the automatic block signals and the character and safety of the service. One of the extra cards contains a map of the road showing all the important stations. The back of the 15-cent playing card contains the Illinois Traction System's monogram on a conventional layout printed in red and gold. The back of the 25-cent playing card shows the rear end of one of the Illinois Traction System parlor cars printed in three colors.



# Observations of a Traveling Track Specialist

The Author States Some of the More Important Results of a Recent Inspection Trip to Several Doherty Properties

By A. SWARTZ

Vice-President Toledo & Western Railroad, Toledo, Ohio

IN the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 16, 1916, page 491, there appeared an article describing the work of the traveling specialists in the organization of Henry L. Doherty & Company. At the suggestion of the editors the writer has set down some results of his observations made during a recent trip as traveling track specialist for this company. No holding company, of course, operates a property with the expectation of allowing it to become a burden, but rather expects the property to maintain itself and earn some dividend for the holding company. This involves the standardization of methods and materials on the several properties operated by the holding company. Following the general policy of the Doherty interests to apply all possible methods for increasing the efficiency of their properties, the method described in the article referred to was developed. The general principle is not new, but as applied to electric street railway and interurban properties, it seems to possess some elements of novelty.

There is virtually no difference between the plan of using specialists to co-ordinate maintenance and operating methods of street railway properties and that which is carried on by any large steam railway system. A steam railroad is made up of a number of divisions maintained and operated by uniform methods except as these are modified to accommodate them to local conditions. Similarly the holding or operating company which controls electric railways in different parts of the country can standardize methods and materials with similar exceptions.

The holding company which absorbs a number of properties naturally falls heir to a variety of physical and operating conditions. With a systematic plan, however, it is in my opinion an easy matter to standardize with the aid of the experience of local managers. The opinions of these managers, without a comprehensive system, would result in great lack of uniformity.

In the Doherty organization the managers are frequently called in for consultation and are kept in close touch with the operating heads at New York, with excellent results for the local properties and the holding company itself. One can imagine that where a street railway is part of a local utility handling power, lighting, water and possibly gas, the manager cannot have time to go into the details of each department as thoroughly as he would like, and in some cases he does not have exceptional experts in charge of the departments. He is then pleased to have his property visited by men accustomed to specific classes of work, for to these he can refer the difficulties which they are especially qualified to rectify. The case is similar to that of the track foreman on a large steam railroad system who is delighted to have the roadmaster spend a few hours with him occasionally so that he can relieve himself of his troubles and get advice from one who really knows.

On a trip which I recently took for the Doherty interests I found many instances where reductions in

expenses could be secured, although there were others where increased expenditure seemed advisable in order to reduce future maintenance and operating costs. Some notes of observations on this trip are given below.

## TIE SPACING

At one point I found that 70-lb. T-rail had been used in concrete paving with steel I-beams placed 10 ft. center to center. The track was a solid structure of concrete from the top of the paving to the bottom of the foundation, which was 5 or 6 in. below the tie. The equipment used on this track was not very heavy, in fact, not over 1500 lb. per foot of track, so that the stress on rail and ties was not exceptional. The result of this extreme spacing of ties was seen in the unsatisfactory condition of the track at some points, although elsewhere it was holding up well, the tie rods, placed midway between ties, tending to maintain the gage.

On another property wooden ties with 7½-ft. spacing formed virtually the same construction as above. After having observed conditions in several locations with different tie spacing, I am practically ready to recommend that on the Doherty properties the tie spacing be increased to 3½ or 4 ft. between centers on small properties where light cars are used. This will result in a material saving on several properties.

I realize that this recommendation may elicit criticism, but many engineers will agree with me when they consider the small load per square foot and the low stress in the rail itself which are involved under the conditions mentioned.

It surely seems unreasonable that a street railway with a load seldom in excess of 2000 lb. per foot of track should use the same tie spacing as a steam road with a load of, say, 6000 lb. Why, therefore, cannot a street railway during reconstruction increase the tie spacing and save money? On one job in Toledo, one track was laid with ties on 3-ft. centers and the other was laid at the same time with ties on 2-ft. centers of standard construction having a concrete foundation. This track has been in use for four years and I see no evidence of unsatisfactory results with the greater spacing.

## THE LIFE OF TIES

As indicating the variety of conditions which the track specialist meets, I would say that on one property I found yellow pine ties being destroyed by dry rot in six or seven years. On another property oak ties were being bought at a lower price than yellow pine would have cost, on still another property oak ties were cheaper than on the one just mentioned, while on another property oak ties were more expensive. It is obvious then that, in standardizing a system as a whole, the purchase of ties should be left to the local managers.

I believe that more attention should be given to the use of creosoted ties even on small properties, for even if these cost 30 or 40 per cent more than good white oak ties, they will last enough longer to offset the extra cost and will also save by reducing track maintenance. A creosoted tie costing \$1 or \$1.10 will last



eighteen or twenty years in open track, providing care is taken to keep excess moisture away from it. A good oak tie, costing 60 or 70 cents will, under the same conditions, probably last eight or ten years. My observation leads me to believe that creosoted ties in pavement may last thirty years.

#### THE MATTER OF BALLAST

A great many properties have cheap ballast right at their own doors and can save money by using it. On one property which I visited, in the coal mining district, piles of shale which, as the accumulation of years, provided a natural source of ballast at little cost to the railway. This forms an excellent ballast, furnishing good drainage. I noted the tendency of small railways not to make the proper use of cinder ballast for track foundation, but to allow the track to be maintained on ordinary soil. Power house cinders, which are usually sold for less than their value or are not used at all, could have been used here to improve very greatly the riding qualities of the track. I strongly believe in the use of good cinders under ties and especially on open track in the outskirts of cities or on interurban systems. Continued use will eventually make a good sub-grade and the finest kind of foundation for stone ballast.

One company visited was crushing its own stone ballast and was furnishing local contractors with crushed stone for concrete work. A small plant for this purpose often brings in a good revenue.

#### PROPER DEPTH FOR PAVING BRICK

On some properties I found that 60-lb. A. S. C. E. rail was being used with brick pavement in which the bricks were 4 in. deep. The result was not satisfactory, for the paving will necessarily sink somewhat between ties, leaving those on the ties higher than the balance. The track had a crown of about an inch and vitrified clay nose blocks were used against the T-rail. The blocks, however, were too short and the flange or nose of the block was so shaped that vehicular traffic very readily kicked them up. At a number of points these difficulties had been remedied by the use of paving bricks 3 in. deep, which were very satisfactory.

#### TRACK DRAINAGE

On one property very poor drainage conditions were found, in fact, I believe the worst I ever saw. The roadway was of a very sticky clay composition, so that after every rain the sub-grade became a mere mud puddle. The difficulty had been partly remedied by using ballast made by breaking up vitrified retorts from a smelting plant. These were broken up in small pieces, not as small as they should have been for the best results, as some were as large as 5 or 6 in. across and 2 in. thick; however, when this ballast was applied to the roadbed and well tamped under the ties and filled up to the top of the tie it drained away the moisture in a surprising manner. While the broken retort material was of a spongy character and had a tendency to absorb water, it did allow the rainfall to get away from the track. An objection to the use of such large pieces was that when the ties are to be renewed it will be costly to replace them. I suggested, therefore, that the material be broken up smaller. This ballast was used principally on an interurban system, although some city track was similarly ballasted. The unsightliness of the ballast was, of course, against its use in the city.

The importance of good drainage is illustrated from the experience of the Lake Shore & Michigan Southern Railway, the track of which owes a great deal of its

perfect riding qualities to the attention paid to drainage.

#### SINGLE-TRUCK CARS AND TRACK MAINTENANCE

On a number of properties I attributed the high maintenance charges per track to the use of single-truck cars. Unless such are especially built to overcome teetering, criticism from the public will be incurred even though to the casual observer the track is in fair condition as to surface. The result is that the track forces have to put a great deal of work on the track which would not be necessary with double-truck cars.

In selecting types of single-truck cars managers will have to consider this question carefully. I realize that it costs more to haul a double-truck car on account of the excess weight, but I am of the opinion that the increased wear and tear on the equipment and the increased (esthetic) track maintenance will go a long way toward offsetting the increased haulage charge. I realize that this statement may bring a storm about my ears and I hope that it does. I believe that it is a matter which, in our anxiety to reduce operating costs for transportation, has worked to the detriment of the maintenance department.

#### STANDARDIZING PURCHASES AND STORE ROOMS

One of the main purposes in the investigation recently made was an attempt to standardize the use of materials and to centralize the purchasing and storing of them at a fairly central location. This would eliminate the stock accounts of the several companies to quite an extent, save in the original purchase prices, and assure prompt delivery. It frequently occurs on small properties that when certain work is to be done the proper material is not available and it may be difficult to secure prompt delivery. Makeshifts are sometimes adopted instead of the proper materials, and the work must soon be done over again. Centralizing a store room should to a great extent prevent this.

In addition, it often happens that small companies must pay premiums on their supplies because they cannot buy in large enough quantities to get reasonable prices. This applies to rail, bars, spikes, bolts, special work, etc. There is no reason why special work cannot be standardized with, say, three or four typical types of construction for different layouts. An example of what can be done is seen in Detroit, Mich., where standardization has saved the railroad company a great deal of money. I expect to recommend to our company a system of standardization for all departments of our property and believe that a material saving must result.

### A Co-operative Safety Advertising Campaign

By Working Together, Public Utilities, Manufacturers and a Leading Newspaper of Beaver Falls, Pa., Financed an Effective Publicity Undertaking

THERE was recently concluded in the city of Beaver Falls, Pa., which has a population of slightly more than 12,000 inhabitants, a safety publicity campaign which may prove suggestive to other communities. It was initiated by W. H. Boyce, superintendent Beaver Valley Traction Company, who proposed to the three local newspapers an advertising campaign to be jointly financed by the manufacturers and public service companies of the Beaver Valley.

The suggestion of Mr. Boyce appealed to the *Evening Tribune*, which put a solicitor into the field to explain the proposition to the companies and to collect the



necessary funds. The *Tribune* has a daily circulation of about 5500 copies and it is widely distributed throughout Beaver County and in fact, throughout the western part of Pennsylvania. Sums varying between \$25 and \$100 were secured, the amount depending upon the number of employees of the subscriber. Sufficient money, about \$900, was secured to provide for the publishing of twenty full-page advertisements and these appeared on Saturdays during the past spring and early summer. A sample of the advertisements are reproduced herewith. Some of them contain very much more text than the one illustrated, the type being too small for reproduction on a small scale.

The first advertisement announced the inauguration of the campaign, advocating common-sense care in the

SAFETY ADVERTISEMENT NUMBER FIFTEEN

## Start NOW to Practice "SAFETY FIRST"

**You're Enjoying Good Health**

-That's Pleasant

**You Want to Remain So**

-That's Natural

**You May Be Careless**

-That's Possible

**You May Have An Accident**

-That's Probable

**You Sincerely Hope Not**

-That's Evident

**Then Practice "Safety First"**

-That's Wisdom

SAMPLE SAFETY NEWSPAPER ADVERTISEMENT IN RECENT  
BEAVER VALLEY CAMPAIGN INAUGURATED BY  
LOCAL ELECTRIC RAILWAYS

prevention of accidents and urging the close observance of simple safety rules at all times. It was stated that the one object of the campaign was to be to prevent accidents and deaths due to accidental causes. The manifesto was signed by the Beaver Valley Traction Company; the Pittsburgh, Harmony, Butler & New Castle Railway; the Penn Bridge Company, and more than a dozen other manufacturers.

In addition to running the advertising copy in the *Evening Tribune*, it was reproduced on cardboard each week and 200 copies were distributed pro rata among the subscribers to the campaign. These cards were posted prominently throughout the shops, carhouses, etc., and served effectively to reinforce the newspaper publicity.

The Kansas City (Mo.) Railways Company is putting twenty snow sweepers through the shops. The vestibules of these sweepers are being inclosed and the heaters rearranged so that they will be of more service in keeping the motorman warm.

## B. R. T. Employees Complete Organization

THE employees of the Brooklyn (N. Y.) Rapid Transit Company on Sept. 28 completed the organization of their independent union by altering the by-laws of the Employees' Benefit Association, which had been in existence for sixteen years, so as to provide for the election of a group of departmental trustees. These men, in accordance with the plan described in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12 and Sept. 2, are to be spokesmen for the men of each department and present any grievances they may have to their superiors. The unanimity with which the alteration was accepted by the men was shown by the fact that before the meeting 9812 out of the total 10,200 employees in the association had voted by proxy in favor of the amendment. The 3000 men at the meeting voted as one man in favor of the amendment. In speaking to the men President Williams said in part:

"In taking this last formal step in a program of co-operation, we are merely strengthening the ties of mutual confidence which have long held us together. We are not merely adding safeguards to the protection of our mutual interests. We are not celebrating merely a local achievement. We are making a notable contribution to industrial and corporate history. We are demonstrating to Greater New York and to the world that many thousand men—joint workers in a great enterprise—can, when imbued with a common impulse and animated by an intelligent purpose, settle their own difficulties and look out for their own concerns without any dictation or interference from non-resident or resident busybodies.

"We are demonstrating to society that transportation need not be paralyzed at the whim of any small group of mischief-makers. We are proving conspicuously and conclusively that the forestalling, or adjustment of causes of discontent which always attach to working conditions, require no new laws, no official orders, no public investigations, no outside arbitrations. We are necessarily diminishing the opportunities for making a living to many agitators in politics, in labor circles and among social reformers, but there is still room left for all these in respectable and helpful employments, even if such new occupations be less remunerative and require harder labor. We are giving notice, especially to certain residents of Detroit, Troy and Boston, who have sought to disturb our peace, that in our working organization we have brains enough, and the disposition, to manage our own local affairs according to our own ideals and opportunities."

After referring to his thankfulness that the loyalty of the employees had been proved true in spite of the Amalgamated Association organizers in other parts of New York, President Williams continued:

"You perhaps do not know how much interest has been taken throughout the country in your attitude during the disturbing times of the past three months. There have been many inquiries from individuals and some from public service corporations as to how it happened that with practically all the street railway employees of Greater New York on strike, the men on the Brooklyn cars have remained loyal and have refused to allow the public to be inconvenienced by interruptions to service; and from some inquirers have come requests for copies of your association's new by-laws. While there were other contributing causes, the main reason, and the fundamental one, why our men have remained true is because we trusted them and they trusted us. This mutual confidence is the solid structure which years of close relations have built up. It makes no dif-



ference what wages are paid, what hours are required, what other conditions or privileges of employment prevail, if there is no reciprocal belief in sincerity of purpose there can be no sound foundation for industrial peace. If you are convinced that your company's management is sincere in its attitude toward you and will share its prosperity with you as it is able, you would not be real men if you did not stand by your company when it needed you. And, on the other hand, if your company believes in your loyalty toward it, it would indeed be a mismanaged company if it did not do the best it could for you. We have both met the test—and our mutual respect and confidence were never greater than they are to-night.

"The action which your association has taken has strengthened our old relations by supplying a better opportunity for exchanging ideas not only as to conditions surrounding employment but as to other interests of the company. I feel sure that we have entered upon a new era in our relations which will greatly promote our ambition for a model public service corporation. We cannot separate or get very far from each other if we all adhere to the principle which has animated us in the past—square dealing among ourselves and the success of the company. There always will be among men differences of opinion, but I have found that nothing scatters differences so quickly among intelligent and honest-minded men as frank discussion of facts. The disposition to be fair has been amply demonstrated in the past—the opportunity for full information on which to base conclusions is now furnished by the representation which each department will have in company councils."

## \$65,000 Buildings for Detroit United

THE office building and carhouse shown in the accompanying reproduction from the architect's drawing are under construction for the Detroit United Railway at West Jefferson Avenue and Mecca Street. These were mentioned briefly in the news columns of last week's issue of the *ELECTRIC RAILWAY JOURNAL*. The office building is to be of pressed brick and its dimensions are 64 ft. wide by 70 ft. deep. On the lower floor



NEW CARHOUSE AND OFFICE BUILDING FOR DETROIT UNITED RAILWAY

will be offices for the line superintendent, carhouse foreman and cashier, an assembly room for motormen and conductors, and a rest room for employees. The second floor will be used for a locker room and dormitory for the night crews.

The carhouse, which will take care of Fort, Grand Belt, Springwells and Wyandotte-Trenton cars, will replace the carhouse located at Fort Street and Clark Avenue. It will be of brick, 209 ft. deep by 116 ft. wide and will house twelve cars in the pithouse and eight cars in the washhouse. It will also contain a boiler room, compressor room, employees' wash and locker rooms and a stock room. The total expenditure on the two buildings will be more than \$65,000.

## Setting Power Service Standards

ALL electric railways that sell power will have to face, sooner or later, the problem of meeting the standards of power service set by a regulative body of some form or other. Circular No. 56, "Standards for Electric Service," recently published by the Bureau of Standards, contains much, therefore, that should be of interest to electric railway men. In this "circular," which is a paper-bound volume of 259 pages, the bureau presents a survey of the general field of State and municipal regulations relative to standards for electric service, and suggests rules and ordinances which may form the bases of future commission regulative codes and town or city ordinances.

The results of the survey are described under seven main headings, namely: The adequacy and safety of electric service; meters and instruments; standardizing laboratories of State public service commissions; rules and regulations for electric service as adopted by State commissions; suggested rules for the regulation of electric service by State commissions; the regulation of electric service by city ordinance; suggested ordinances for the regulation of electric service in towns and cities. Also, various summaries and tabulations are given in the several appendices.

In an analysis of the various factors which affect the adequacy and efficiency of electric service it is pointed out that these matters are determined very largely by three general sets of conditions. These conditions are specified as: Central station operation; the transmission and distribution system; the energy translating and metering devices. The questions of voltage variations on lighting and power circuits, the interruptions of service, the frequency of alternation on alternating-current circuits, the accuracy of watt-hour and other meters, the efficiency of lamps, motors, and other energy translating devices are given as factors which affect the adequacy of service.

The rules and regulations for electric service as adopted by the various State commissions have been collated under some thirty-five different headings. Some of the factors named in the preceding paragraph form the headings which are of most interest to railway men. According to the tabulation of rules on the subject of voltage regulation, the permissible variations range from 3 per cent above or below to 10 per cent above or below the standard. Five per cent variation either way from normal seems to be the common permissible frequency variation. Permissible meter errors range from 1 per cent to 4 per cent. These percentages of error apply to both light and heavy load conditions.

In the model rules and regulations which the bureau has drawn up to assist in the future guidance of State commissions, the permissible voltage variations for several different classes of service are specified. For lighting service it is specified that the voltage shall be within 5 per cent plus or minus of the standard adopted, and the total variation of voltage from minimum to maximum shall not exceed 6 per cent of the average voltage in cities and other incorporated places having a population in excess of 2500, nor 8 per cent of the average voltage in all other places. For power purposes a voltage variation not exceeding 10 per cent plus or minus is specified. The permissible frequency variations are the same as given above. The maximum permissible meter errors are plus 2 or minus 4 per cent at light load and plus or minus 2 per cent at heavy load.

Copies of this circular may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 45 cents per copy.



## Damages and Accident Prevention at Boston

There Has Been a Marked Increase in the Burdens  
Imposed on the Company by Legislative Accident  
Enactment, Judicial Interpretations  
and Jury Verdicts

IN connection with the investigation of the finances of the Boston (Mass.) Elevated Railway, now being conducted by a special recess commission of the Massachusetts Legislature, an interesting analysis of the trend of damage payments for injuries has been prepared by Russel A. Sears, general attorney for the company. The causes of increased payments for injuries in the face of the company's well-known safety record and continuous efforts to avoid accidents of every kind are discussed in Mr. Sears' statement with great clearness and indicate the difficult problem ahead of the company's legal department. An abstract of Mr. Sears' analysis is printed below.

The solicitation of accident cases had hardly more than started in 1897, when the Boston Elevated Railway leased the West End Street Railway. At that time the law of negligence relating to carriers of passengers was more favorable to the carriers than to travelers on the highway and very frequently more favorable than to the passengers on its cars. Since then many changes have taken place, nearly all of which have operated to the disadvantage of the railway, and it has only been through great effort that the company has been able to hold its outlays for legal expense down to the ratios that it has. In order to show the conditions surrounding the legal department compared with former years, the calendar years 1913 to 1915 inclusive have been compared with 1910 and 1911, omitting 1912 on account of abnormal conditions associated with the strike of that year. Practically the same officials have been in charge of the department for these years and there has been no permanent important change of policy, in general.

The principal burdens which the company has been called upon to bear are:

1. Adverse legislation.
2. Liberal construction of the law by the Supreme Court toward claimants.
3. Liberality of juries.
4. Reluctance of justices of the trial courts to set aside what may be considered excessive verdicts and in taking away cases from the jury for want of evidence of negligence.
5. Increase in the number of claims and suits resulting from the foregoing.

### ADVERSE LEGISLATION

The Legislature of 1910 declared that a sign or any other warning prohibiting a passenger from riding on the front platform or warning him that such riding was at his own risk should not constitute a defense. The designation of certain doors in rapid transit cars as "In" and "Out" was declared no defense for the company in 1911, and in 1907 the Legislature increased the amount recoverable in case of death caused by the railway to \$10,000 and no longer permitted the maximum to be levied only in case of gross negligence on the part of the company. Up to 1914 there was no presumption in favor of a traveler on the highway that he was in the exercise of due care at the time he sustained the injury. In that year a statute was enacted which throws on the defendant the burden of proving that due care had been exercised.

During the past few years the Supreme Court has

greatly liberalized the law toward persons injured by a railway. Before 1911 a traveler on the highway who was struck by the car of a street railway company had little or no chance of recovering damages, but now practically all such cases are questions for the jury and in this item alone the company pays approximately \$50,000 more per year than before decisions of the court which have completely changed the course of such cases. Until recently, a person who fell in a street car while it was being started, even though the start were violent, had no case, but now if the plaintiff has a firm hold broken, the case goes to the jury, and even this theory is unnecessary if the plaintiff produces an expert prepared to testify that the car could not start unless through a defect in the equipment or negligent operation.

Collisions between cars and vehicles are now nearly all cases for the jury, whereas three or four years ago they were frequently taken away on account of lack of care on the part of the plaintiff. The Supreme Court has also decided that even two or three persons around a car might constitute a "crowd," in connection with cases of pushing passengers into spaces between platforms and cars.

As important as these decisions were in increasing the legal expenses of the company there has been little or no help through favorable decisions during these years.

### LIBERILITY OF JURIES

The juries, particularly in Suffolk County (containing Boston proper) where the great majority of the company's cases are tried, have never been so liberal as in the past two or three years—and they never were stingy. The average of plaintiffs' verdicts from September, 1906, to June, 1911, inclusive, was \$1,062.36, and from September, 1911 to June, 1916, inclusive, \$1,438.58, an increase of 39.5 per cent. The average of all verdicts plaintiffs, defendant and non-suits, for the court trial years from September, 1906, to June, 1911, inclusive, was \$352.45 compared with \$575.28 in the later period, an increase of 63.3 per cent. The personnel of the juries is not improving; not only this, but the fact that a higher standard of prices in commodities and wages prevails in the industrial world, has been an element in the cause of the increase in the verdicts. Again, there is reason to believe that the theory of the Workingmen's Compensation act, in so far as it provides compensation whether there has been negligence or not on the part of the company, is to some extent wrongfully applied to passengers and to non-passengers in litigated cases where personal injuries have been sustained.

### PRACTICE IN TRIAL COURTS

The justices of the Superior Court, before whom the cases are tried by the juries, have been more reluctant to take plaintiffs' cases away from the jury on account of insufficiency of evidence during the past three years than formerly, as is also the case in setting aside verdicts for the plaintiffs which may fairly be considered excessive. It is believed that the recent agitation concerning the recall and election of judges has played some part in this situation.

### INCREASE OF CLAIMS AND SUITS

These legislative acts and court decisions have led to an increase in the number of claims and suits and to corresponding increases in payment for suits; and although in the period taken for comparison there has been a decrease of 9.5 per cent in the number of accident reports received by the company, there has been at the same time a large increase in the number of



claims and suits and the payments required to adjust them as shown in the following tables:

PASSENGER ACCIDENTS					
	Calendar Years 1913-14-15	Calendar Years 1910-11	Per Cent Increase	Per Cent Decrease	
Total number reports received	9,697	10,701	...	9.5	
Reports per million car miles	212	238	...	10.9	
Reports per ten million passengers carried	355	422	...	15.8	
Total number claims and suits settled	4,537	3,666	23.7	...	
Number settled per million car miles	99	85	22.2	...	
Number settled per ten million passengers carried	166	145	14.4	...	
Total amount paid in settlement	\$398,792	\$305,996	30.3	...	
Amount paid per million car miles	8,705	6,796	21.9	...	
Amount paid per ten million passengers carried	14,618	12,183	20	...	

NON-PASSENGER ACCIDENTS					
	Calendar Year 1913-14-15	Calendar Year 1910-11	Per Cent Average Increase	Per Cent Average Decrease	
Total number reports received	5,850	5,942	...	1.6	
Total number claims and suits settled	1,906	1,238	53.9	...	
Total amount paid	\$242,962	\$129,948	57	...	

RAPID TRANSIT LINES			
	1913-14-15 Average	1910-11 Average	Per Cent Increase
Total reports received	3,861	3,174	21.6*
Total claims settled	967	609	58.5
Total amount paid	\$59,420	\$53,535	11

\*Cambridge subway opened March 23, 1912.

In noting the above data, it may be emphasized that the office expenses of the legal department have for the fiscal years 1909, 1910 and 1911, as compared with 1914, 1915 and 1916, shown a decrease of 14 per cent.

Before the passage of the Workingmen's Compensation act and its adoption by the company, the expense to which the company was put by reason of the suits brought, claims made and gratuities paid its employees was about \$11,000 a year. Since the adoption of the act the cost to the company has been in 1912, \$56,212.60; in 1913, \$56,455.24; in 1914, \$78,994.60; and 1915 will be about the same as 1914. These figures do not include the company's extra clerical assistance.

Notwithstanding the burdens placed upon it the Boston Elevated Railway was the first street railway in the country to win the Brady prize. In spite of the distinction conferred upon the company by the award of this medal—the award really meaning to designate that this road stood in the lead of all others in America in safety work, and in spite of the fact that new and improved methods in handling its accident claims, office economies and the adoption of nearly all that is modern and approved in the line of accident prevention, the Boston Elevated has paid nearly as large a percentage of its passenger revenue in recent years as did the West End Street Railway in the last two years of its existence as an operating company. The average for the West End in 1896 and 1897 was 4.05 per cent and for the Boston Elevated in 1915 and 1916 was 3.65 per cent.

With the foregoing conditions surrounding the company—and which are not likely to change to its advantage—with the tremendous increase in traffic in the coming years in a city physically ill-adapted to digest it, with the necessary high standard of safe operation and an ever-exacting traveling public, it appears that the Legal Department has some difficulties to face in the future.

J. H. Wheelwright, president of the Consolidation Coal Company, has offered prizes of \$1000, \$750 and \$300 to boards of trade of cities and towns in territory served by the Monongahela Valley Traction Company, Fairmont, W. Va., for securing during the coming year new industrial establishments.

## Home-Made Sprinkler for Power Station Lawn

At the Millbury (Mass.) plant of the Worcester Consolidated Street Railway, a convenient lawn sprinkler has been assembled by mounting a number of sections of 1¼-in. pipe on wooden posts about 3 ft. above the ground, connecting the pipe with a pump discharge in the adjacent plant and drilling needle orifices in small brass plugs inserted in the pipe every 30 in. Water is



HOME-MADE LAWN SPRINKLER MADE OF 1¼-IN. PIPE SECTIONS

supplied at a pressure of 80 lb. per square inch, and a 2-ft. pipe-handle at one end of the line, which is about 125 ft. long, enables the nozzles to be rotated through an arc of over 180 deg. As shown in the accompanying photographs of the pipe line, the resulting sprays can



VIEW SHOWING METHOD OF ROTATING SPRINKLER PIPE

be adjusted for maximum, minimum or intermediate range with the utmost ease. The pipe line is supported on 3-in. by 4-in. uprights, and at one end a coupling permits the addition of a standard portable sprinkler line.

## New Car Signs for St. Louis

The United Railways of St. Louis, Mo., have installed enameled plates about 5 in. square, bearing numbers, on the front dashboards of their cars. These numbers are for the guidance of road officers and are used to designate the car's place on the time schedule, but do not correspond with those painted on the cars. The cars on each line are numbered consecutively. This new system is expected to make it easier to straighten out traffic tangles after blockades or accidents. Supervisors placed in different parts of the city can identify the cars by the numbers and can tell at a glance the time schedule and routing of any car. In trying out this system a check will be kept on each car.



## Why Toledo Railway Decided on Train Operation

Reasons for Selection of Two-Car Units and of Two Cars Rather Than a Motor Car and a Trailer Are Given

IN an article on the subject of train control appearing in the current issue of the *Electric Journal*, C. A. Brown, master mechanic Toledo Railways & Light Company, Toledo, Ohio, describes the control equipment used on the two-car trains and discusses the considerations leading to the adoption of this type of equipment. After experimenting with rolling stock borrowed from other properties it was decided that two-car units would be desirable particularly in handling crowds from the factories and from the downtown districts in rush hours. The economy in crew expense thus made possible was also a consideration.

In considering the relative merits of a motor car with trailer versus two-motor cars, the following points were brought out:

1. The motor car and trailer form of train unit first considered would give the necessary additional rush-hour seating capacity for the minimum first cost. The additional cost of a two-car multiple-unit train, as compared with the motor car and trailer unit, would be about \$850, or \$425 per car, for the particular type of equipment considered.

2. This two-car train unit, however, could be efficiently used only during morning and evening rush hours, and on holidays or other special occasions. The combined seating capacity of motor car and trailer would be about 110 people, which would ordinarily be much greater than the traffic requires. Therefore, during a large part of the day the trail car, representing about 37 per cent of the first cost of the train unit, would lie idle in the barn.

3. During the non-rush hour part of the day it would be necessary to keep in service, on certain lines in the city, rolling stock that was comparatively expensive to operate, while half of the new cars, being trailers, could not be used economically.

4. On Sundays and special occasions during the summer the traffic on some of the suburban lines, particularly the Toledo Beach line (13 miles long), becomes so heavy that it is necessary to supplement the regular suburban equipment with some of the regular city cars. As the line is single track it sometimes happens that as many as four or five cars follow one another from siding to siding and, aside from the element of risk, there is a considerable delay at sidings awaiting for the last car to come up. This situation would be considerably improved by even partial multiple operation of trains of three to five cars.

5. Trailer operation involves four-motor equipment of such capacity that the most economical type of motor, the field-control type, could not be used unless the more expensive remote control were purchased. This was because no K controller of a suitable type had as yet been developed. The economy of field control in the Toledo service had been demonstrated by a sample equipment placed in service in 1914. Careful tests showed a saving in power of approximately 17 per cent compared to the non-field-control equipment, with both equipments geared to give about the same free running speed. This large saving might not be obtained on the new cars, but it was estimated that the saving in power due to field control would be at least 7 per cent.

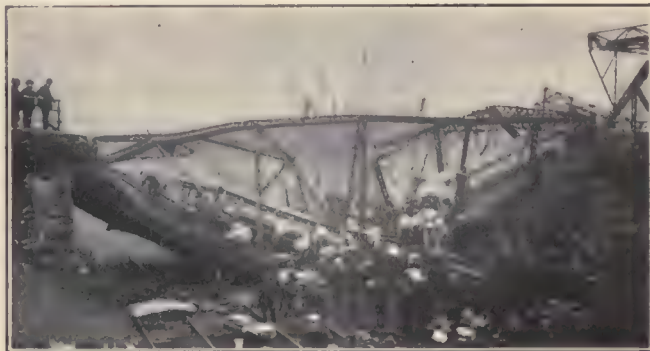
6. The combined weights of the motor car and the trailer would be less than that of the two-car multiple-unit train, but the weight of the single car with two motor's would be less than that of the car equipped with four motors for hauling the trailer. Therefore, if

two-car train operation were realized 100 per cent of the time, the motor car and trailer would have the better weight economy, but any mileage made by the four-motor car operating along would require additional power as compared to operating the two-motor car.

A careful study of these different factors led to the conclusion that the relative economy of the motor car and trailer as compared with the two self-propelled units depended altogether upon the percentage of time two-car operations would obtain. It was estimated that out of a working day of sixteen hours there would be about six hours during which two-car trains might be operated economically. With this as a basis, a comparison was made of the power consumption of motor cars and trailers versus motor cars. It was assumed that the new motor cars would be operated all day, and that in one case the trailers would be withdrawn during non-rush hours, and in the other case the two-car multiple-unit train would be broken up into twice as many one-car trains and some of the older equipment could be sent to the barn. It was estimated that under these latter conditions the saving in power alone would just about offset the additional fixed charges for the double-motor train control equipments, and this, together with the savings in maintenance and the operating and other advantages mentioned, were considered important enough to justify the investment.

## Railway Accident on Cleveland, Ohio, Bridge

THE accompanying illustration tells part of the story of an accident which occurred at 5.15 p. m., Oct. 3, 1916, on the lower West Third Street Bridge in Cleveland, Ohio. A runaway Scranton Road car jumped the track at the approach to the bridge, crashed into two posts and precipitated the span to the B. & O. Railroad tracks 23 ft. below. A second car entered the span as



BRIDGE SPAN IN CLEVELAND (OHIO) COLLAPSED BY RUNAWAY CAR

it was sinking, and went down with it. The bridge lies at the foot of a long, steep grade, and there is a short but sharp curve at the entrance to the span.

The span that gave way is of the through truss type, 105 ft. long and 32 ft. 6 in. wide, and constructed of wrought iron. It was erected in 1888, and is somewhat corroded; but it is said that the engineers of the railway and the city agree that probably even a new bridge could not have withstood the impact, although a plate girder bridge might have stood up. In the accident two persons were killed and a number were injured.

The Kansas City (Mo.) Railways are installing folding steps and rear doors which fold outwardly on the "900" type of cars, which are the last type to be so equipped. Automatic door signals, for the use of the motorman in signaling the conductor of approach to a stop are also being installed on all the cars.



## A Self-Waving Flag

THE pneumatic flag-pole and flag shown in the accompanying illustration was designed and constructed under the direction of the illuminating engineering



SELF-WAVING FLAG EQUIPMENT DESIGNED FOR ATLANTIC CITY CONVENTION

laboratory of the General Electric Company for the Atlantic City convention exhibit. The cut shows the equipment as temporarily erected in a yard at the factory and without a large bronze ball in which the pole will terminate.

The pole is a metal tube 27 ft. high, and 5 in. in diameter at the top and 9 in. at the bottom. It is set over the exhaust port of a 2-hp. electric motor-driven blower, to be inclosed in a wood box having at one end a section built up as a supporting guide for the mast. The base will be surrounded with foliage to make it appear to set solidly in the ground. The principal section of this hollow flag-pole was originally part of the mast of the

steamship Clermont, the skeleton of which was used at the Hudson-Fulton celebration in 1909.

For a distance of 9 ft. from the top of the pole it is perforated with two rows of  $\frac{1}{2}$ -in. holes drilled  $1\frac{1}{2}$  in. apart. When the blower is in operation the blasts emitted through these holes hold the flag and impart to it the waving motion suggested in the illustration.

## Standardization of Line Construction in California

THE Railroad Commission of California has issued fifty-eight orders to electric and telephone corporations looking to the safety of human life by the standardization of electric and telephone transmission system construction, and involving the spending of more than \$750,000 to this end. The orders took the form of authority for extensions of time within which these public utilities may comply with Chapter 499 of the laws of 1911, as amended by Chapter 600 of the laws of 1915 referring to the placing, erection, use and maintenance of electric poles, wires, cables and appliances.

The Legislature passed this act for the purpose of removing the danger to employees engaged in the construction, reconstruction, maintenance and use of such property, and of the general public. The statute provided that it become effective six months from the date of its passage in so far as it relates to new work, and that five years should be allowed for the rebuilding of existing work to meet the provisions of the law. The Legislature in 1915 amended its previous act, and vested in the Railroad Commission the authority at its discre-

tion to grant additional time to corporations, and instructed it to pass on all work done.

The commission's order names specifically the period within which each utility must do a third and also two-thirds and the entire work, which last must be completed before June 30, 1919. All the companies are to report to the commission from time to time as ordered upon the progress of the changes. The orders direct the companies to proceed with the work as rapidly as possible, and vary in length of extensions granted according to the conditions under which the utility operates.

## Colorado Association Discusses Investments and Regulation

THE fourteenth annual convention of the Colorado Electric Light, Power & Railway Association held at Glenwood Springs, from Sept. 21 to 23, was the largest in the association's history. In his presidential address John J. Cooper of Denver outlined some of the work of the past year. The papers of particular interest to electric railway managers were the following:

The first paper, "Utility Investments," by W. C. Sterne, president of the Municipal Properties Investment Company, Denver, called attention to the fact that the day is past when the public gives little study to its investments. Among the important things which the present-day investor wants to know are: The efficiency of management at the time of investment, dangers of differences with municipalities and of labor and wage difficulties, variations in prices of materials, the extent of rate and service regulations, an accurate forecast of depreciation elements, the effect of management changes, effect of periods of business depression on earnings, character and plane of political activity, financial plan upon which the utility is to be or has been established, and marketability of its securities.

The paper on "Customer Ownership," by William H. Hodge, manager of the publicity department of H. M. Byllesby & Company, Chicago, covered the matter of inducing consumers of a public utility to become financial partners in the enterprise and dealt with the experimental plan initiated to sell utility stock to utility customers in cities and towns served by the Northern States Power Company.

M. H. Aylsworth, chairman of the Colorado commission, speaking on "Utility Regulation," reviewed several recent decisions of the Supreme Court of Colorado which directly affect public utilities. One of these, wherein the court held that no state court can interfere with the public utility commission in its decisions under the act, he declared is of vital importance.

On Saturday F. W. Herbert, statistician of the Colorado commission, opened the proceedings with a paper on "Depreciation Accounts," which excited considerable discussion. The depreciation account of the utility should show in detail the "build-up" of the depreciation reserve so it may be prepared to give a correct analysis of the charges and credits to this reserve. The distinction between repairs and replacements, said Mr. Herbert, or items that should be charged to maintenance or reserves, must be determined for each individual case. He favored charging all repairs and minor replacements to the operating expense accounts and providing in the reserve for replacement of major units only.

A paper, "Tell the Public What You're Doing," by S. J. Ballinger, advertising manager of the Trinidad (Col.) Electric Transmission, Railway & Gas Company, could be epitomized in the sentence, "Tell them everything."



COMMUNICATIONS

Interurban Future Never Brighter

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

INDIANAPOLIS, IND., Sept. 28, 1916.

To the Editors:

Referring to the recent article by F. W. Doolittle on the "Present and Future Development of Interurban Railways" in your issue of Sept. 2, I believe that one must not take too seriously his rather doleful analysis of "available" statistics. An attempt to read the horoscope of the interurban industry by means of the census reports, which do not comprehensively separate the urban and interurban lines without a first-hand knowledge of the systems themselves, is to do the lines a great injustice.

Any forecast for the average interurban necessarily depends upon the physical and income factors of the property. While the interurban is not subject to the same analysis as the steam road, it is primarily a railroad, and every effort of its management should be towards the intensified development of all the income factors to result in the maximum earning power of the property. This requires aggressive management, and if the road is not an economic blunder and has latent possibilities, its financial standing is assured. Otherwise, a reorganization has occasionally been found necessary to reduce the fixed charges so that its normal earnings

cent from 1890 to 1893, it would scarcely have been difficult for any intelligent observer to perceive that these roads could not escape a receivership.

Moreover, at Indianapolis, Columbia, Dayton and Louisville, interurban traffic agreements with the steam roads would now be useless without the expenditure of millions of dollars for freight terminals, yards, rebuilding lines, equipment. And would these expenditures be justified? There is considerable doubt.

The interurban lines out of Indianapolis were among the pioneer lines. The few mistakes these lines made in car design, overhead work, substation location, etc., have practically all been corrected. Any doubt as to the future will be quickly dispelled by going over the Chicago, Lake Shore & South Bend Traction Co., the Illinois Traction System, the Fort Dodge, Des Moines & Southern, or the Texas properties, which are among the newer lines. Still better, examine their financial statements.

The future of an interurban road is better understood if it is first considered from a financial standpoint. If one knows what is required as minimum earnings to protect the security holders, an examination of the earnings and a comparison of the earnings with those of other systems will better enable him to judge the possibilities of the road under discussion. For investment purposes, figures are reduced to earnings and costs per mile. Consider a theoretical case, as follows:

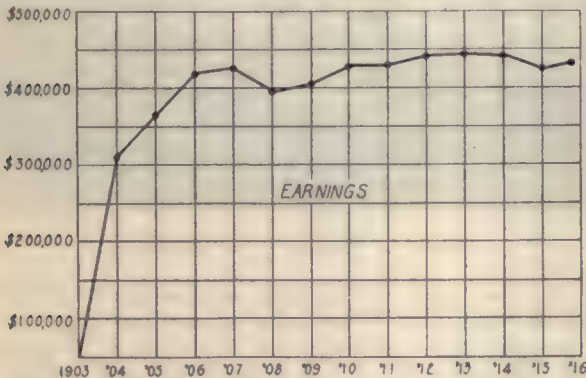
The cost of an interurban per mile should be (minimum).....	\$30,000
Fixed charges at 5 per cent.....	1,500
The line should earn \$5,000 per mile a year.....	\$5,000
Operating expenses and taxes per mile at 60 per cent....	3,000
Balance .....	\$2,000
Less fixed charges per mile.....	1,500
	\$500
Less sinking funds on bonds per mile.....	250
Surplus per mile.....	\$250

Compare this with one of the oldest lines out of Indianapolis, built in 1904. Main line, 62.31 miles; branch, 23.76; total, 86.07 miles. Main terminal, Indianapolis; sub-terminal, Lafayette:

In a typical year the gross income per mile was.....	\$4,700
Operating expenses and taxes per mile (58 per cent)....	2,770
Balance .....	\$1,930
Fixed charges per mile.....	1,430
	\$500
Dividends per mile .....	269
Surplus per mile.....	\$241
Funded debt per mile (no sinking fund).....	\$28,697
Capital stock .....	5,228
Total .....	\$33,925

Would you state that this road is in a "doubtful condition"? The accompanying curve showing the gross earnings of this same line indicates how little the automobiles have affected the earnings. This line runs through the richest farming land in the State, and with the excellent roads it is surprising how little the earnings of this road have been reduced. Approximately 88 per cent of its earnings are derived from passenger traffic.

The statement by Mr. Doolittle "that the interurban is not a device for promoting the growth of communities," is erroneous and misleading. There are any number of towns near Indianapolis that have been wholly built up by the interurbans. Ben Davis, six miles west of Indianapolis, had 100 people in 1906. At the present time the population is nearly 1000. The inhabitants travel entirely on the interurban to Indianapolis. The Vandalia does not stop a train and has no station. The majority of residents are people who work in Indianapolis but prefer the advantages of living in the country. The merchants of Indianapolis, Fort Wayne, Lafay-



GRAPH SHOWING GROSS OF ONE INTERURBAN LINE

will easily take care of them. If the interurban cannot stand alone, it is certain to find its place as a unit in a larger utility company where the former errors of capitalization, engineering and operation can be corrected to the benefit of all concerned. The future of interurban lines was never brighter than at the present. The mistakes of interurban builders have been fewer in proportion than those of the steam roads.

Mr. Doolittle states: "Thirty years ago many of the shorter steam lines found themselves in the present situation of the electrical lines" i.e., they were unable to get traffic agreements with the larger roads. The error of this analogy is appreciated from a knowledge of what was happening thirty years ago to the steam roads. In the period from 1892 to 1896, about 56,000 miles out of a total of 180,000 miles of main track passed into receivers' hands. This included among the "smaller" lines, the Southern Railway, the Wabash, the Erie, the Union Pacific, the Baltimore & Ohio, the Reading, the Atchison, the Northern Pacific, etc. They had been loaded with debt. With generally unstable conditions in the banks and the loans exceeding deposits by 25 per



ette, Terre Haute and Richmond can testify in no uncertain terms as to the substantial and material effect of the interurbans upon the growth and prosperity of their community. The falling behind of Cincinnati in population compared to other cities of the same size has been ascribed directly to the lack of entrances and a proper interurban terminal for the various lines—a condition they are going to considerable expense to remedy. The movement of approximately 18,000 people a day in and out of Indianapolis, or the stoppage of this movement, as during the flood of 1913, would perhaps better illustrate the relation between the interurban and the communities they serve.

There are at present a number of interurban extensions and projects which only await the return of normal material prices and financial conditions to insure their completion.

The competition of automobile trucks with the traction freight service has not reached a serious phase. The dozen or so trucks operating out of Indianapolis in competition with our low freight rates generally go out of business after about twelve months of unprofitable operation.

A. J. BOARDMAN, Superintendent.

## More About the Building Association and the Loan Fund

EMPLOYEES' MUTUAL BENEFIT ASSOCIATION OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

MILWAUKEE, WIS., Sept. 30, 1916.

To the Editors:

In response to your suggestion that the readers of the *ELECTRIC RAILWAY JOURNAL* might be interested in learning more about the two funds which form a prominent feature of the welfare work of this company, and which were mentioned briefly in the abstract of my paper which you published in your issue for Sept. 9, 1916, I take pleasure in submitting the following:

Referring to page 443 of the issue mentioned, it will be noted that we have two entirely separate funds; namely, the fund of the Savings, Building & Loan Association, and the Loan Fund. These are quite distinct, the funds of the association being handled like those of any association of this type, while the Loan Fund is an entirely separate one furnished by the company.

The Savings, Building & Loan Association is a corporation organized under the laws of the State and subject to examination and regulation by the banking commissioners' office of the State. Any employee may purchase stock in the association and pay for it in installments of 50 cents per month per share. Another class of stock can be paid for at the rate of 75 cents per month per share, and there is still a third class which may be paid for at the rate of \$1 per month per share. The great majority of employees purchase the stock which is paid for at the rate of 50 cents per month per share. This stock matures in about eleven years. It will be seen that an employee taking \$1,000 worth of this stock will pay into the funds \$5 per month for a period of eleven years or a total of \$660. At the end of the eleven years, when his stock matures, he receives a check for the sum of \$1,000, the difference, \$340, being the interest which has accumulated on his savings. It will readily be seen that this makes saving very attractive to the average thrifty employee.

The Loan Fund was established nearly five years ago. As stated above, the funds are furnished entirely by the company and are intended to meet emergencies arising from sickness or death, or other trouble which may temporarily embarrass an employee. The amount that

may be loaned from the company fund is limited, of course, and application for a loan must be made through the superintendent under whom a man is directly employed. No interest charge is made but the employee is required to pay back into the fund a definite part of his loan per month.

This fund provides a remedy against unexpected financial emergencies which may confront a man and which might force him to seek relief at the hand of a loan shark.

BERT HALL, Welfare Secretary.

## Name for One-Man Car

CHARLOTTESVILLE & ALBEMARLE RAILWAY COMPANY

CHARLOTTESVILLE, VA., Sept. 26, 1916.

To the Editors:

I have noticed the discussion in your columns as to a suitable name for the one-man cars and suggest "Single Operated" as being the most appropriate.

We have recently placed the name of the operator in the front of the car, stating that "The operator of this



FRONT OF CAR IN CHARLOTTESVILLE

car is —," and we find this very satisfactory indeed. The accompanying illustration shows the front of one of our cars with this lettering. We have a small paddle with the operator's name on one side and that of his mate on the other. Then, when the second motorman boards the car he turns the paddle over and exposes his name. The paddle is suspended by two brass hooks.

JOHN L. LIVERS,

Vice-President and General Manager.

## Data for Determining Cause of Rail Corrugation

EMPLOYEES' MUTUAL BENEFIT ASSOCIATION OF THE DALLAS, TEX., Sept. 15, 1916.

To the Editors:

In a communication on page 407 of your issue for Feb. 26 I urged the compilation of a report blank covering, in the form of questions, all suspected causes of rail corrugation. Since writing this letter, I have been collecting opinions and facts from various sources on the subject, and as a result have prepared the accompanying list of questions, to which additions might well be made by others who have found other facts or theories with regard to rail corrugation which had not become known to the present writer. After this series has been made as nearly perfect as possible it could



be issued to advantage by the A. E. R. E. A. committee on corrugation in printed form to every street or interurban railway in the United States. When these are returned filled, the committee would have some definite basis on which to draw conclusions. The present method of discussing theories on this subject without complete data is simply a waste of time, as is the idea of taking the experience on corrugation of a few isolated properties, no matter how large those properties may be.

In this connection I might say that on a recent trip I visited a large number of members of the association, and in every case of street railway or interurban members I have found more or less trouble from rail corrugation. I have explained to each my idea in regard to this question list, and in every case the company has requested a copy of the questions inclosed, has promised to use them, and, where necessary, to add other questions which might cover any peculiar conditions on the track in question.

I see no other way of getting the necessary information on which to base positive data on this subject. Hitherto the method seems to have been for single individuals to form theories on this subject by pure mathematics, chemistry or mechanics, or else from their own isolated experience, and no such theory has been advanced by any one person which has not been immediately contradicted by another person either from theory or from isolated experience.

H. S. COOPER, Secretary.

#### "CORRUGATION DATA" SHEET

NOTE: Use separate sheet for each type, kind and weight of rail.

##### *Rail*

Dimensioned section of rail affected.

Length of rail.

Metallic constituency (analysis).

##### *Sub-Base*

Character, i. e., concrete slab, concrete beam, stone, gravel, dirt?

##### *Roadbed*

"Ballasted" (under and between ties), stone, gravel, dirt.

Depth of ballast under ties.

"Rigid," depth of concrete under wooden tie, or, if steel tie is used, depth of concrete under rail.

Does base of rail rest on the concrete for full length or only at ties?

##### *Ties*

Wood or steel. If former, give dimensions; if latter, give make and type.

Spacing of ties (track center) on both tangent and curves.

##### *Fastenings to Ties*

If wood ties, kind of spike and number to tie. If metal ties, method and number of fastenings.

If tie-rods are used, give spacing of same. If tie braces are used state whether every tie, alternate ties, etc.

##### *Joints*

Give make, type and number of bolts, rivets, etc., per joint.

If welded joint, state method of welding.

##### *Gage.*

Give exact original gage of corrugated track.

Give present gage of corrugated track.

##### *Curves*

Are all curves guarded? If not, give maximum radius of curve not guarded.

Give gage of curves, both guarded and unguarded.

Give elevation of curves according to radii—or otherwise.

##### *Traffic*

Is traffic one way or both on same track?

If both, give proportion tons-per-wheel in each direction.

##### *Cars*

Maximum speed and average speed of cars over track affected.

Single or double truck. If both, give proportion of each.

Wheelbase of single trucks. Truck wheelbase of double trucks.

##### *Wheels*

Diameter of driven wheels.

Diameter of traveling or pony wheels.

Cast iron or steel. If latter, give make and type.

Give dimensioned section of tread and flange of all new wheels used on corrugated track.

Give exact gage of new or repressed or reground wheels.

##### *Braking*

Hand, air or magnetic? Are coasting recorders or watt-meters used?

#### *Paving*

Give kind and condition of paving between and outside of rails.

#### *General Questions*

Do you grease or oil any curves, all curves, or only those that are guarded or of a certain minimum radius?

What lubricant do you use on curves and how do you apply it?

NOTE: In answering the following "comparative" questions please bear in mind that the comparison is desired only as between similar rail, sub-base and roadbed.

Have you noticed any difference in corrugation between curves that were lubricated or not lubricated? Which were less corrugated?

Have you noticed any difference in corrugation on the tangent rail running out of the curves lubricated and not lubricated?

Have you occasion for frequent or copious use of sand on the whole or portions of the corrugated track?

Have you noticed any difference in corrugation where sand is not used and where it is used?

Are any portions of your tracks regularly artificially watered?

Have you noticed any difference in corrugation between the portions artificially watered and those subject only to rainfall?

Have you any street intersections in paved streets where unpaved streets come in and where dirt is brought in from these streets onto your track?

Have you noticed any difference as to corrugation at such points as compared to intersections of paved streets?

Is the corrugation worse on tangent or on curved track?

Is the corrugation worse on the inside or outside rail of guarded curves? What is the situation with respect to unguarded curves?

Is the corrugation worse on rail where cars are operated entirely in one direction?

Is the corrugation worse on levels or grades, and, if cars are operated only in one direction, is it worse on ascending or descending grades?

#### *Some Leading Questions*

Taking into consideration the conditions contained in above questions, the portion of your rail that is worst corrugated is operated under which of these conditions? Answer this by writing the numbers preceding the questions giving the conditions.

Have you any theory, based on your experience or full knowledge of all track and traffic conditions in one or more localities, as to the actual cause, or causes, of rail corrugation?

Have you any practical suggestion as to its elimination, diminution or prevention?

NOTE: As the above requested theory and suggestion are desired from actual practical experience and knowledge, it is necessary that the questions preceding the last three be answered.

## The Car-Development Issue

UNIVERSITY OF ILLINOIS

URBANA, ILL., Oct. 4, 1916.

To the Editors:

Allow me to congratulate you on the Convention Issue of the JOURNAL for Sept. 30, 1916, which has recently been received. Although I have not had time to go through the various articles in detail, it appears to be a masterpiece on the subject of cars and car equipment.

The subject is timely, coming as it does when economies must be introduced wherever possible. I am convinced that car design warrants more study, not perhaps from the builder's standpoint, but from that of the user. Being treated from this side, the entire issue is valuable to the operating company and to the student of electric railway problems.

I am especially glad that you are trying to explode the "local conditions fallacy." The more one travels in different communities, the more evident does it become that the problem of rapid transit is one common to all, and that the solution may be a general one regardless of locality. The resulting changes to meet local conditions have been in most cases trifling in their general effect, while they invariably increase the cost of equipment to what might well be termed a prohibitive figure.

Ten years ago one might have pointed to a number of types of cars that could be well called "standard." Now there is no uniformity in type, even for the same service in the same city. May it not well be that we are passing through a transition period in the design of equipment, and that in a few more years a set of new and improved standard types will be evolved from the present chaotic conditions?

A. M. BUCK,

Assistant Professor of Electric Railway Engineering.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

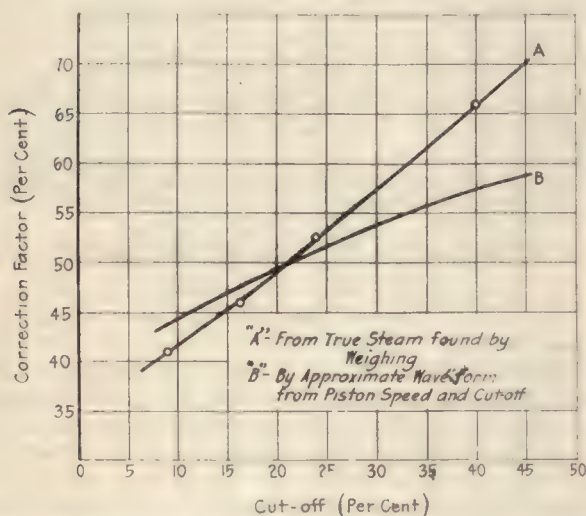
D. C. Regenerative Locomotive on Canadian Railway—Measuring  
Reciprocating Engine Steam Flow—Sleet Cutter for Over-running  
Third Rail—New Shockless Railroad Crossing—Reverse Phase  
Relay of New Design—Operating Features of Condenser Arrester

### The Steam Flow Meter Applied to Reciprocating Steam Engines

BY VICTOR B. PHILLIPS

Engineering Assistant, Cleveland (Ohio) Railway

It is frequently necessary to measure with some accuracy the steam consumption of a reciprocating engine. In plants of any size the maintenance of the pistons and cylinders, in order to hold down the loss from leakage steam, is a large item of expense. A check on this loss is important. Except where surface condensers are used, there has been no direct way of measuring the engine steam consumption, other than the use of some factor applied to the indicated steam. Because of the wide variation of leakage steam, the indicator card is practically of no value in this connection. The writer recently had occasion to measure the steam consumption



CURVES SHOWING RELATION OF STEAM FLOW METER CORRECTION FACTOR TO POINT OF CUT-OFF

of some large reciprocating engines, and to this end investigated the subject in its various phases, including the use of the steam flow meter.

At first thought the use of the steam flow meter for this purpose seems quite impracticable. The meters generally used are designed for steady, uniform flow only. Of these the pitot tube type of meter is the most common. Now the steam headers leading to large engines invariably vibrate in spite of the most rigid fastenings and we have therefore some idea of the extremely turbulent and violent conditions of flow, which exist in these headers. Obviously then, these conditions preclude all possibility of analysis, and whatever constants are involved must be empirical. The pitot tube, perhaps more than any other means of measuring fluid flow, requires proper conditions. Therefore its use in connection with pulsating flow must at best be lacking in close accuracy, while the use of empirical constants may be had only under the strictest adherence to the limiting conditions of these constants.

The steam flow in an engine header may be con-

ceived as a regularly intermittent wave flow. An analogy would be the wave of an oscillatory electric current where the instantaneous value of current corresponds to the rate of flow of steam. Furthermore, a steam flow meter measuring this pulsating flow may be likened to an ammeter for measuring oscillatory or alternating current. In electrical power measurements we are interested primarily in the effective value of an alternating current—in other words, the square root of the average of the squared instantaneous current values and an a.c. ammeter is made to read in terms of effective amperes. In order to accomplish this the needle of an a.c. ammeter is damped so as to stand steady at a point corresponding to the average of the deflections for the instantaneous current values. Suppose now, that the mercury columns of a steam flow meter be so damped as to prevent their oscillation with intermittent flow. The result is an instrument closely analogous to the a.c. ammeter, and it is evident that a meter so damped will show a deflection corresponding to the average of the squares of the instantaneous velocities and that the scale will show a value corresponding to the square root of this deflection. In the case of steady flow for which the meter is originally calibrated, this square root of the average square is the same as the average of the instantaneous values; just as in direct current we make no distinction between average and effective current because they are the same.

On the other hand, in alternating current whatever the wave form, effective current is always larger than average current and the ratio of these two values depends entirely upon the wave form. The case is similar for steam flow, and we may conclude that whatever the form of the pulsation wave existing in the steam header the reading of the meter from the steady flow scale will be larger than the average velocity. As it is the average velocity in which we are interested and not the "effective" velocity, the meter reading will always be too high, and the ratio that it bears to the proper value will depend entirely upon the wave form of the intermittent flow. If it were possible to determine the nature and form of the pulsation wave existing in the steam header, we could readily arrive at the correction factor to be applied to the meter reading. However, the complexity of the wave form and the difficulties incident to such a determination preclude the possibility of all but empirical constants. The writer did try to approximate the wave form from the instantaneous piston speeds, for various cut-offs, but the constants determined from these approximated wave forms varied considerably from the actual constants. The results are shown graphically and indicate some relation between theoretical and actual values but insufficient correspondence to be of practical value.\* The results are of value, however, in that they show some correspondence to theory—even the crude theory represented by the curve.

In any event, we may conclude that the general

\*The actual constants referred to here were determined by reading the meter and simultaneously weighing the condensate, using a surface condenser.



theory outlined above is entirely valid and that the use of empirical constants, having due regard for the type of engine and piping arrangement, is practical. Data obtained by the writer, although necessarily limited, verify this conclusion.

The first step in applying the steam flow meter to pulsating flow is the effective damping out of all pulsating motion in the mercury columns of the meter. This may be accomplished by simply introducing into the columns orifices of sufficient restriction. In the present instance short lengths of glass capillary tubing were fitted into place by bushings of rubber tubing. The result was, in this case, the total elimination of all movement of the columns due to the intermittency of flow; but at the same time an instantaneous response to the smallest changes of load upon the engine. The principle of this method of damping is, of course, readily understood and needs no further treatment. It is certainly very simple and entirely effective. Perhaps for some types of fluid flow meters this device may be impracticable; but in any event its equivalent should be readily devised.

As already indicated the correction constants to be applied to the meter readings on intermittent flow depend upon wave form and therefore upon cut-off and load. The values of these constants or correction factors must be determined empirically. They must, moreover, be limited in their application to a close adherence to the conditions under which they are formulated. However, it should be pointed out that in the case of large engines especially, the number of distinctly different types of engines and of different pipe sizes and relations is exceedingly limited. It is only in application to large units that any system of measuring steam consumption is justifiable. Hence, a comparatively small amount of empirical data should make feasible the direct measurement of steam delivered to any kind of steam engine—certainly a measurement eminently worth while.

Before concluding, the procedure followed by the writer in determining the necessary correction factors for the particular case in hand will be outlined. The meter was connected into the high-pressure pipe leading to a 1200-kw. Robert Wetherill engine, operating on a surface condenser. The engine was then held at a number of different loads and the condensate weighed for definite periods of time. At the same time the steam flow meter was read and the cut-off determined by indicator cards. In this way the relation between correction factor and cut-off was established. The meter was then applied to a 1600-kw. C. G. Cooper engine operating non-condensing. The relation between load and cut-off was determined for this engine. It was then assumed that for the same percentages of cut-off the correction factor was the same for both engines, and in this way the factor for each load was readily available. Later, the steam consumption of an entire non-condensing plant determined in general, by this method, was closely checked by exceedingly exhaustive and careful heat balances in which the prime-mover consumption was found by the method of difference. The discrepancies were less than 2 per cent, thus affording a close check upon the method of direct measurement by meter.

In conclusion, the writer wishes not to propose unreservedly the application of the steam flow meter to pulsating flow, but rather merely to suggest this way of measuring engine steam consumption to the end of further discussion and investigation. The desirability of such a measurement in many cases is evident, and the results here presented, though exceedingly limited, do perhaps merit further consideration.



SLEET-CUTTING SHOE IN POSITION, SHOWING LOCKING PIN, AIR HOSE AND CYLINDER

## Combination Sleet Cutter and Current Collector

A Home-Made Pneumatic Device for Cutting Sleet on Covered Over-running Third-Rail

BY J. B. BLAICKLOCK

Master Mechanic Atlantic City & Shore Railroad

The accompanying description and photographs are of a pneumatic sleet cutter designed by the writer for cutting sleet on a covered over-running third-rail system.

On account of the small clearance between the third-rail and cover it was necessary to design a cutting shoe which could be left down. The pressure is applied from the motorman's cab without disturbing the shoe, which had also to be used as a current collector. The ordinary slipper type shoe similar to that used by the Atlantic City & Shore Railroad on its Ocean City division, is hinged on a 1-in. spindle which is rigidly held in the shoe bracket by cotter pins. This is changed in the sleet cutting shoe, and the bracket holes are bushed with brass and the spindle lengthened out to take the crank, which is operated by the air cylinder. The spindle is made to work easily in the brass bushings and is held in position by steel collars bolted to it. The end of the spindle is keyed for a  $\frac{3}{8}$ -in. key and a 2-in. steel drum is fastened to it. The crank works on this drum and



SLEET-CUTTING SHOE IN A RAISED POSITION, SHOWING TOOTHED STEEL BLADES WELDED ONTO THE SHOE



is thrown in and out of gear by a small steel pin, fitted with a tee handle. The ordinary shoe springs are left on and when the sleet cutting device is not needed the small pin is lifted up and the shoe is then free to work in the usual way.

The hole in the drum in which the pin engages is bored out, which allows the shoe about  $1\frac{1}{2}$ -in. lift when the air is not on and the mechanism is in mesh. The cylinder is made from a gray iron casting, bored out to 2 in. in diameter, and is bolted to the underside of the third-rail beam. There is a  $\frac{5}{8}$ -in. flange left on the top of the cylinder which fits up snug to the beam and takes the thrust off of the holding bolts.

The piston is made of steel and is fitted with a 2-in. cup leather. The piston rod is attached to the crank by a small steel link, which makes a flexible connection and also allows a slight adjustment of the shoe.

The cutting shoe is of the ordinary type with hard steel blades electrically welded to the underside. These blades are ground with toothed edges to help the breaking up of the sleet.

The car is fitted with two steel cutters, one on either side, and the air is supplied through  $2\frac{3}{8}$ -in. pipes, which are bolted to the truck. These pipes are connected to the pipes on the underside of the car with rubber hose which allow for the free movement of the truck. A piece of rubber hose connects the end of the pipe on the truck with the air cylinder and insulates it from the ground. The valves in this piping system are located in the cab. There is a one-way and a two-way valve, which allows either shoe to be operated.

With a tank pressure of 100 lb. per square inch, we get approximately 600 lb. per square inch on the shoe, which is sufficient for ordinary sleet storms. The weight of the extra mechanism on each shoe is 24 lb. and the total weight, including pipes, etc., is approximately 55 lb. The whole apparatus, except the air piping on the car body, is removed after the winter season.

## D.C. Regenerative Locomotive on the Lake Erie & Northern\*

By Separately Exciting Fields of Motors Power Is Returned to Line on Descending Grades at Speeds Above 7 M.P.H.

BY C. C. WHITTAKER

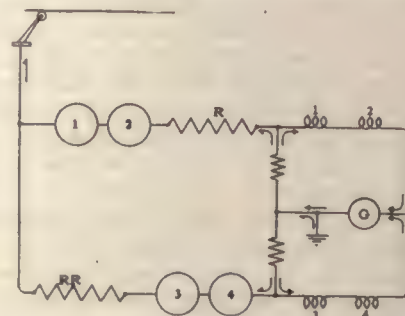
After extensive tests there was placed in service on the Lake Erie & Northern Railway in April of this year a 1500-volt, direct-current regenerative locomotive. This locomotive is of the standard Baldwin-Westinghouse swivel-truck type, weighing 60 tons, having 36-in. wheels and equipped with four standard, 125-hp. field-control motors, geared 24:53. It is designed for passenger or fast freight service and is capable of exerting a continuous tractive effort of 6520 lb. at 26.5 m.p.h., and 8520 lb. at 22 m.p.h.

The control for acceleration consists of the usual bridging control, except that the motors are bridged both in going from series to parallel, and from parallel to series when shutting off. Beside being necessary to the regenerative control, this feature is advantageous for acceleration alone, as much of the burning on the transition switches is eliminated.

Both acceleration and regeneration are controlled by a single master controller. This is provided with the usual mechanical interlocks between the main and reverser levers and with other special mechanical interlocks which render false manipulation by the operator

impossible. There are sixteen notches for acceleration and eleven for regeneration. The operation of the control during acceleration is entirely manual, while during regeneration it is either manual or automatic, as desired.

Regeneration is accomplished by using the main motors as generators connected in series-parallel at the higher speeds, and all in series on the lower speeds. The fields are separately excited during regeneration by

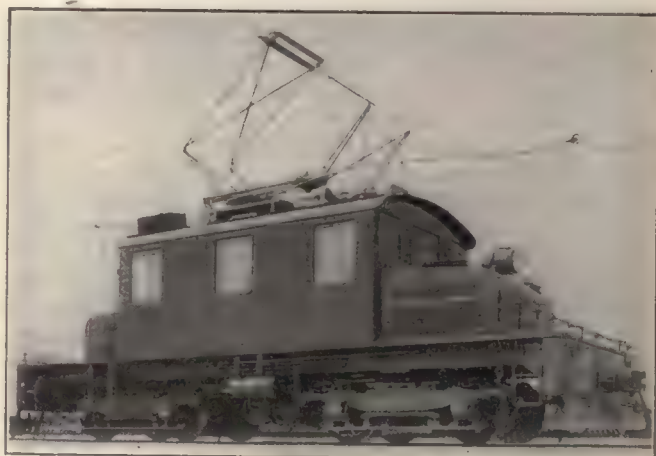


SIMPLIFIED DIAGRAM OF CONNECTIONS OF REGENERATIVE LOCOMOTIVE WITH CONTROLLER ON FIRST NOTCH FOR REGENERATION

current from a motor-driven series generator, whose voltage ranges from 70 to 85.

The field control feature is used only on acceleration, all regenerative running being done with the full field connection in order to decrease the current required for excitation. A simplified diagram of the connections obtained on the first notch when regenerating is shown herewith. From the location of the ground connection it will be seen that the regenerated current flowing from the substation through the ground connection passes through the same resistor as the exciting current from the generator, and in the same direction. The effect of this condition is to weaken the main motor fields automatically whenever the regenerated current increases. This means of securing motor stability has proved exceptionally effective, the motors never having flashed over either while on test or since installation.

On account of this inherent stability during regenera-



1500-VOLT, D. C. REGENERATIVE LOCOMOTIVE ON LAKE ERIE & NORTHERN RAILWAY

tion, it is not essential that the line voltage be the same as the regenerated voltage when the locomotive motors are first connected to the line. Tests show that motors may be connected to the line without injury when regenerating at double line voltage. A selective relay is arranged to control the line switch connecting the motors to the line and is adjusted to cause this line switch to close whenever the controller is in a regenerative

\*For an article describing the general features of the 1500-volt electrification between Galt and Brantford, Ont., see ELECTRIC RAILWAY JOURNAL, issue of May 27, 1916, page 986.



position and when the voltage generated by the motors is approximately 1500. If the speed of the locomotive is sufficiently high when the controller is turned to the braking position, the selective relay will act on the first notch; if not, the field drum will automatically rotate notch by notch, short-circuiting the resistance in series with the motor fields, thereby strengthening them until the voltage generated is sufficient to cause the selective relay to act. This will bring in the line switch and complete the main circuit to the line. The resistances, *R* and *RR* in the diagram, are in series with the motors when the first switch closes, and the rotation of the field drum is stopped from the time the line switch closes until this series resistance has been cut out.

The field drum and change-over switch are mounted in the cab. The main drum is rotated by means of a standard *PK* operating head. The upper part of the main drum is provided with interlock fingers so connected that it is possible to move the drum from the master controller, notch by notch, in either direction. A second drum manipulates the main and control change-over connections, and is operated by the usual reversing mechanism of the *PK* head. It also is controlled from the master controller.

Connected in series with the main motor armatures is a low-current relay, the function of which is to disconnect the motors from the line when regenerating with the motor fields at maximum excitation as soon as the regenerated current has fallen to approximately 30 amp. per motor. This feature prevents needless overheating of the main fields while the regenerated current is inappreciable.

A fan, supplying air to the main motors and serving as a load to keep down the speed of the motor-generator set when there is no load on the generator, is mounted on an extension of the shaft at the generator end. The motor-generator set weighs 1500 lb., or 50 per cent more than the blower motor which would be required if this set were not used. The motor is provided with a series field connected in series with the field of the generator.

This locomotive is not designed to regenerate at speeds below 7 m.p.h., since to do this would require too much current through the main fields. Moreover, in reducing the speed to 7 m.p.h., approximately 93 per cent of the kinetic energy which was stored in the train when running at 26.5 m.p.h. has been utilized.

The smoothest stop is made when the controller lever is turned to the last notch, resulting in automatic regeneration. Then, as the ammeter indicates that the regenerated current is falling off after the last notch on the field drum has been reached, an air-brake application should be made which will begin to retard the train just before the retardation from the regenerative brake ceases. When the regenerated current drops to 30 amp., the low-current relay will operate, disconnecting the motors from the line, and the remainder of the stop is made by the air brakes.

Among the principal advantages which regenerative control in general offers are:

1. Decrease in net power consumption.
2. Decrease in wear on brakeshoes, wheels and brake rigging.
3. Decrease in brakeshoe dust nuisance with reference to subways.
4. Decrease in heat liberated from brakeshoes with reference to subways.
5. Additional means of braking, thereby affording greater safety.

From the results thus far obtained, when applied where conditions warrant, this system of regenerative braking promises to yield very satisfactory results.

## The Condenser Lightning Arrester for Electric Railway Protection

BY Q. A. BRACKETT

Previous to the development of adequate lightning arresters it was not an unusual procedure for a conductor to protect his car from lightning during a storm by stopping the car and pulling down the trolley. Nowadays such an interruption to service would never be tolerated, and at night passengers would never be willing to be left in darkness unnecessarily. It was but natural therefore that other and better methods of protection should be developed as the need grew with the progress of the industry.

Next to disconnecting the apparatus from the line, the most effective protection from incoming lightning surges would be to dead ground the line directly ahead of the apparatus. In the past it has not been considered possible to make use of this method of protection while there was power on the line, as the short-circuit for the lightning was also a short-circuit for the dynamic current.

The development of the condenser arrester, however, has made it possible now to use this very effective method of protection without any of its former disadvantages. This is due to the fact that the lightning current is of very high frequency while the power current is direct. It is only necessary, therefore, to ground the line through some device which will let high frequency current pass freely, yet will oppose the flow of direct current. The condenser possesses these characteristics; to direct current it is an insulator, while to current of lightning frequencies it is an almost perfect conductor.

If, then, a condenser of adequate dielectric strength and capacity is connected directly between line and ground ahead of the apparatus to be protected, it will provide a short circuit for incoming lightning, but will not allow the escape of any power current whatever. Unlike other arresters, it needs no series spark gap to protect it from leakage of power current and subsequent overheating. Likewise, it has no power current to break following lightning discharge and, therefore, needs no series resistance to assist it at the expense of reducing its freedom of discharge. This also means less burning and wear and tear on the arrester, fewer surges on the line, and eliminates all need for current interrupting devices such as circuit breakers, magnetic blowouts, etc. Maintenance expense is reduced practically to zero, since the arrester is not affected by heat or cold and has no parts that deteriorate or need readjustment. This low maintenance expense is especially important in the case of railway arresters either for car or line protection on account of the large number of units involved.

The condenser itself is impregnated with a special wax of much higher dielectric strength and melting point than the paraffine hitherto commonly used in the manufacture of condensers. This condenser, properly insulated, is inclosed in a weatherproof iron box. Between the condenser and the line lead an adjustable series spark gap is provided, while the condenser itself is shunted by a high resistance. When the spark gap is used the resistance serves to keep the condenser discharged down to zero voltage, so that it can provide somewhat greater protection than it could if always charged to line voltage, as would be the case if the spark gap was not used. The latter can be set extremely close to the line voltage since there is no power current to interrupt.

Where the apparatus to be protected is old or known to have weak insulation, so that it could not stand the



voltage rise necessary to break down even a short series spark gap, the gap should be closed entirely. This will do no harm whatever to the arrester and will enable it to protect weak insulation more readily. This in various cases has made possible the regular operation of cars whose motors without this type of protection would have had to be rewound on account of weakened insulation.

While the condenser arrester is comparatively a newcomer in the electric railway field it is by no means an untried experiment. The first 1500-volt direct-current line in this country was equipped with condenser arresters on all its rolling stock as early as 1911, and the results have been so satisfactory that most of the line is now protected by condensers as well. Many other installations have since been made throughout the country. The present season, however, has brought marked improvements in condenser design that have resulted in both better condensers and smaller sized complete arresters.

Arresters of the present design will pass 500 amp. without allowing the voltage to rise above 800 volts, or 1000 amp. with a voltage not over 1600 at a frequency of 10,000 cycles per second. Almost all lightning surges are of still higher frequencies. At 1,000,000 cycles the above current values would become 5000 and 10,000 amp. respectively. No other form of arrester, with the possible exception of the electrolytic type, comes anywhere near providing such freedom of discharge, and the electrolytic type has a maintenance expense many times greater, which makes it less suitable for car and line protection where many units are involved.

## An Inclosed-Fused Switch

The Anderson-Ellcon inclosed-fused switch, shown herewith, has just been placed on the market by the Ellcon Company, New York.

This switch consists of a fuse, clips and a knife blade installed in an insulated box, which is made of a com-



QUICK-BREAK FUSED SWITCH, SHOWING DETAILS OF CONSTRUCTION

bination of impregnated asbestos lumber, fiber and alberene stone. It is so constructed that when opened the fuse terminals are disconnected from the live metal parts and are exposed in such a way as to render them

most accessible for the examination or replacement of fuses.

These switches are designed for high voltage direct-current circuits and are made in both single and double-pole units, the single pole being used principally on grounded circuits.

## Automatic Tap-Changers for Voltage Regulation

For the purpose of insuring good voltage regulation for the Philadelphia-Paoli electrification of the Pennsylvania Railroad, pending the completion of the Chestnut Hill electrification which will help to balance the load on the three-phase generators, an automatic trans-

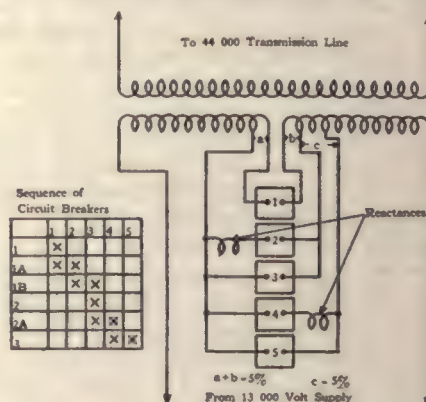


DIAGRAM OF "TAP-CHANGER" APPLIED TO A STEP-UP TRANSFORMER

Steps 1, 2 and 3 are operating positions; other steps are transition positions.

former tap changing device is in use. The principle is shown in the accompanying diagram.

The ratio of transformation and, therefore, the secondary voltage are changed by varying the relative numbers of transformer turns, electro-pneumatically operated oil switches being used for this purpose. The control is automatic, being operated by a compensator, and interlocks are provided to prevent improper operation of the switches.

## A Recent Projector

Since its recent purchase of the headlight, searchlight and lamp business from the Esterline Company, Indianapolis, Ind., the Electric Service Supplies Company has perfected a golden glow projector, which has all the inherent qualities of the golden glow headlight.

It is molded from a greenish-yellow glass, ground to a true parabola by special machinery and polished and silvered as would be the finest French plate glass mirrors. The violet, ultra-violet and other high frequency rays are absorbed by the glass reflector thus projecting a powerful beam of golden-yellow light. These projectors have already been found particularly well adapted to flood-lighting sections of track on electric and steam roads where construction work is carried on at night.

They are manufactured in two sizes, the smaller size being equipped with a 9-in. diameter reflector while the larger size employs a 12-in. reflector. Concentrated filament lamps of any wattage up to 150 in G-25 bulbs having a light center distance of  $2\frac{1}{4}$  in. may be used with the 9-in. reflector, while the 12-in. reflector takes concentrated filament lamps up to 250 watts in G-30 bulbs, having a light center distance of  $2\frac{3}{4}$  in. They are equipped with a focusing device accessible from the outside of the shell so that the beam of light, by a simple adjustment of the focal center, may be concentrated in a straight beam or dispersed to cover a large area.



## Shockless Crossing Now Equipped for Automatic Operation

Control Circuits Are Similar to Those of an Automatic Block Signal System

About two years ago at Slauson Junction, Los Angeles, Cal., a Cobb shockless crossing was installed at the intersection of the tracks of the Pacific Electric and the Santa Fé Railway. This installation was reported in the *ELECTRIC RAILWAY JOURNAL* for May 22, 1915, page 994, after it had been in successful operation for about six months. One of the accompanying illustrations shows the present appearance of this crossing after having withstood the severe traffic to which it has been subjected for about two years.

The daily electric traffic at this point consists of 360 high-speed electric cars made up into 240 trains, aggregating 15,000 tons, while the steam traffic of about 5000



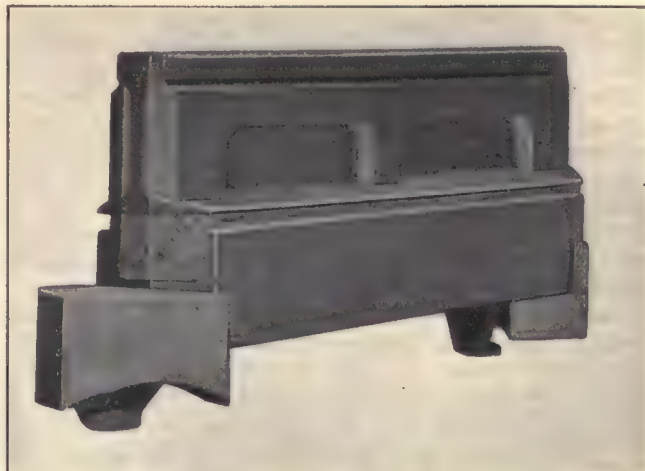
TWO VIEWS OF THE SHOCKLESS CROSSING AT SLAUSON JUNCTION, LOS ANGELES, CAL., AFTER BEING IN OPERATION FOR TWO YEARS

tons daily comprises heavily-loaded freight cars and a few passenger trains. There have been no accidents or delays at the intersection, the rails have not required replacement, and they show less wear than that on a manganese crossing installed on a near-by branch line where the traffic is only one-quarter as great. It is said that the trains pass over the shockless crossing with no more noise or jar than is experienced on continuous rails.

In this crossing the necessity for jump gaps is eliminated by depressing, by a suitable mechanism, the rails which are not in use. The through rails remain at grade, and are so abutted that a continuous bearing surface is presented to the car wheels. The raising and lowering of the rails at the crossing at Slauson Junction is controlled from an interlocking tower, which also controls the switches, signals and derailleurs at this point.



THE EXTERNAL APPEARANCE OF THE SHOCKLESS CROSSING, SHOWING THE FOUR FIXED RAIL CORNERS RIGIDLY BRACED BY THE CONNECTING STRUTS



THE MOVABLE ELEMENT OF THE SHOCKLESS CROSSING, SHOWING THE MOUNTING OF THE RAIL

The excellent results obtained by this crossing led to the installation of a shockless crossing at the intersection of Fourth and Main Streets, Los Angeles. At this location, where the shockless crossing has been installed about six months, several special problems had to be solved. Both the Pacific Electric and the Los Angeles Railway operate cars on Main Street, and as the Los Angeles Railway is a narrow-gage line there are six rails on this street instead of four. The crossing is electrically operated and electrically and automatically controlled, the control circuits being similar to those of an automatic block signal system except that they operate the crossing rails instead of signals.

As the traffic on Main Street is much greater than that on Fourth Street, the control is so arranged that the crossing rails are normally set for the Main Street traffic to pass. The Main Street cars, however, have no control over the action of the crossings, the control of which lies entirely with the Fourth Street cars, which on approaching the crossing cause it to be automatically set so that they can pass. As soon as the Fourth Street car has passed out of the block, the mechanism automatically goes back, so that it is set for the Main Street traffic.

Since the crossing at Main and Fourth Streets was installed further developments have been made which include an improved method for moving the rails. The accompanying illustrations show the latest type of crossing in which the rails are raised and lowered by cams, and the diagram shows how two solenoids are used to accomplish the necessary movement of the camshafts.



HALF OF THE INSIDE OF THE SHOCKLESS CROSSING, SHOWING THE CENTER DRIVING SHAFT AND THE CAMS WHICH RAISE AND LOWER THE RAILS



A heavy cast-iron box made of four sections bolted together forms the foundation of the whole construction. The fixed rail corners rest upon wooden blocks inclosed in 12-in. iron channels, which in turn rest across the corners of the box foundation. Tightly fitted between the fixed rail corners are cast-iron struts, which are securely bolted to the foundation, and inside these struts are the movable rails. One of these rails is shown in an accompanying illustration. The rail itself rests on a hardwood block which is inclosed between the web and two flanges of a steel I-beam.

Fastened to each end of the I-beam is a cast-steel shoe, the lower surface of which bears upon the cam. The upper surface of this shoe extends a few inches beyond the end of the I-beam, and when the rail is in the upper position this surface comes in contact with the lower surface of the channel iron which supports the fixed rail corner, the movable rail being thus locked between the cam and the fixed rail corner. This also provides additional support for the fixed rail corner and prevents any jamming or rattling. A cast-steel hook is bolted to the side of each shoe. These hooks fit in grooves in the sides of the cams and serve to pull the rail downward should there be any tendency for it to stick due to the accumulation of dirt or grit. On the sides of the rail are cast-iron filler pieces, the object of which is to prevent stones and foreign material from working into the crossing.

The rails move up and down through channels with just sufficient play to allow them to move freely, and with enough force to crush any small stones or ice that may get in between the rails and the adjoining iron work. There is no possibility of individuals or vehicles becoming caught in any of the moving parts, because there is no lateral motion nor is there any projecting moving part above the cover.

Half of the internal mechanism of the crossing is shown herewith. The camshafts are supported on journal boxes, which rest on short columns cast integral with the cast iron box foundation. These shafts are geared to the center shaft, which is supported by heavy pedestal bearings bolted to the foundation. The center shaft is driven by heavy

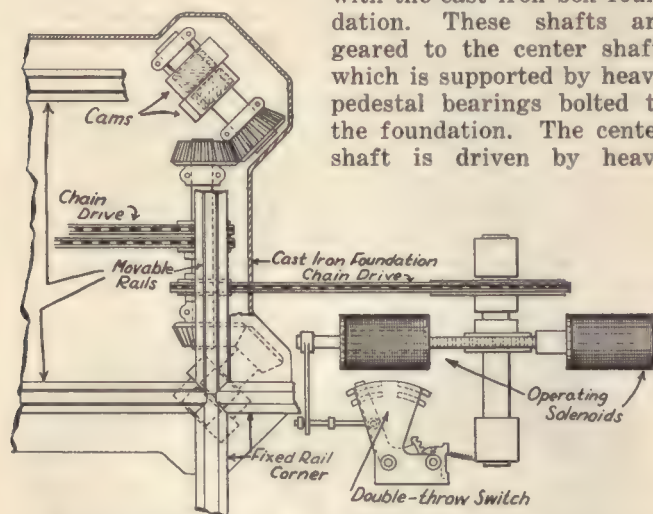


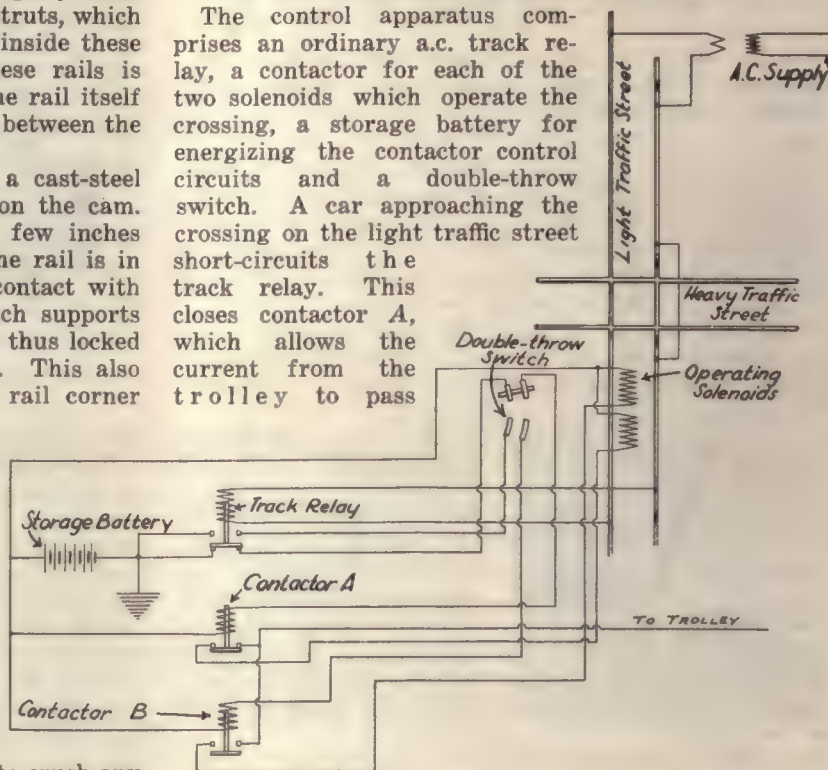
DIAGRAM OF THE OPERATING MECHANISM OF THE SHOCKLESS CROSSING

chains connected to the solenoids, as shown in the diagram. Cast-steel gears are used, and there is no complicated machine work in the whole construction.

The accompanying diagram shows the control circuits, by means of which the automatic operation of the crossing is carried out. On the diagram the street having the greater traffic is indicated as the heavy

traffic street, while the intersecting street is called the light traffic street. The crossing is normally set for cars running on the heavy traffic street, and the cars approaching the crossing on the light traffic street cause it to be set automatically so that they can pass.

The control apparatus comprises an ordinary a.c. track relay, a contactor for each of the two solenoids which operate the crossing, a storage battery for energizing the contactor control circuits and a double-throw switch. A car approaching the crossing on the light traffic street short-circuits the track relay. This closes contactor A, which allows the current from the trolley to pass



WIRING DIAGRAM OF THE CONTROL CIRCUITS FOR THE AUTOMATIC OPERATION OF THE SHOCKLESS CROSSING

through the solenoid and operate the crossing, setting the rails so that the approaching car can pass. The movement of this solenoid also shifts the double-throw switch so that when the car leaves the block the track relay closes contactor B, allowing the current from the trolley to pass through the other solenoid, which resets the rails for the cars on the heavy traffic street. This completes the cycle.

In the crossings that have been installed the operation requires from three seconds to four seconds. The power required to raise and lower the rails under normal operation, of course, is small, but to take care of any emergencies such as the front wheels of a car coming on the crossing before the rails have been completely raised, the operating mechanism is made strong and powerful enough to raise the rails when a car is on them.

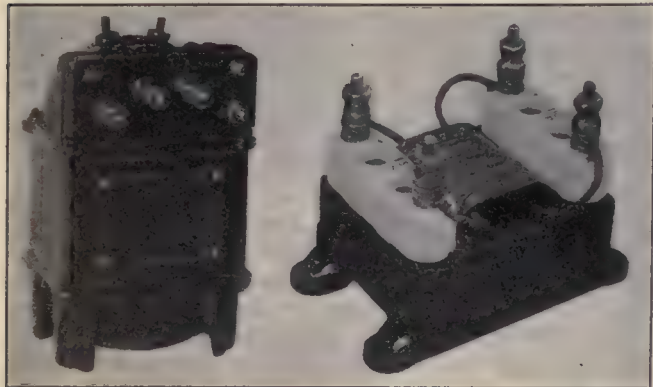
While the crossing just described is operated by solenoids it is obvious that an electric motor, a compressed air mechanism or any other mechanical device can be substituted for the solenoids, the only requirement being that the main driving shaft shall make three-quarters of a revolution in one direction to bring one pair of rails into the grade position, and then a three-quarters revolution in the opposite direction to reverse the operation.

The driving apparatus is preferably placed in a compartment outside the box containing the crossing mechanism, so that it can be more readily inspected, and so that traffic on only one track will be blocked if repairs have to be made. Provision is made for operating the crossing by hand in cases of emergency. Thus far, only crossings in which the tracks intersect at right angles have been equipped, but preliminary designs have been made, to adapt the shockless crossing to tracks intersecting at different angles and on curves.



## Semi-Inclosed Transformers

A complete line of semi-inclosed track transformers used for feeding track circuits in connection with railway signaling and varying in capacities from 5 to 250 volt-ampere 25 cycles and from 5 to 500 volt-ampere, 60 cycles has been placed on the market by the Union Switch & Signal Company. These transformers, as shown, are of the shell type and are arranged for mounting on either a shelf or wall. Those of the lesser



SHELL-TYPE TRANSFORMER FOR RAILWAY SIGNALING

capacities are equipped with standard Railway Signal Association porcelain terminal blocks which bear 14-24 binding posts. Those of the greater capacities are equipped with single terminal boards of treated maple, slate or porcelain, also bearing the standard 14-24 Signal Association binding posts. These transformers are arranged with the requisite number of primary and secondary taps to take care of track circuits of varying lengths and leakage resistances, as well as for signal lighting.

## Railways Use Calculating Machines to Increase Office Efficiency

The amount of both routine and complicated calculations made in railway engineering and accounting offices is constantly increasing owing to the careful records which are kept of the operations of the workmen, the performance of apparatus and the expenditures of the company. In order that the economies effected by accurate records may not be wiped out by the increased cost of clerical work, it is advisable to do as much calculating as possible by mechanical means.

The Monroe computing machine is being used by a score of the leading railways of the country, and is adapted to this service. It has a standard adding-machine keyboard for setting up the numbers involved in the computation, a crank for performing the operations, and a carriage holding the dials which show the results and the proof of the operations as they are completed. The operations of the machine are accomplished by a forward turn of the crank for addition and multiplication and a backward turn for subtraction and division. No special training is required to operate the machine.

The Tri-City Railway, Davenport, Iowa, has installed watt-hour meters in eight of their cars for the purpose of checking up the operations of the motormen. In the office of the transportation department the mechanical calculating machine is used in adding up the total miles run by each motorman and the corresponding total kilowatt-hours of energy used. From these quantities the kilowatt-hours per car-mile are computed.

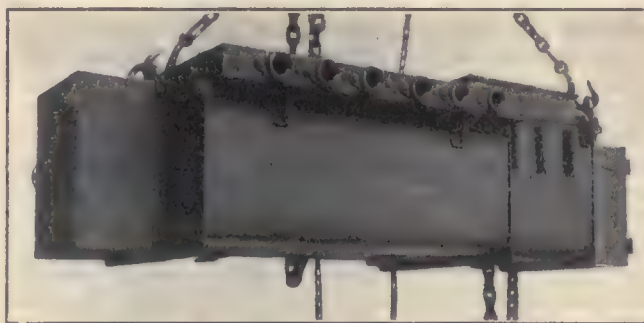
The accompanying table shows how these computations are tabulated. Assuming that the motormen are subject to the same operating conditions, the quantities in the last column indicate the relative efficiencies of the men.

Motormen	Total Miles	Total Kilowatt Hours	Kilowatt Hours Per Car-Mile
1—B. Geertz	928	2,105	2.268
2—Hoffman	531	1,280	2.410
3—Guenther	1,036	2,520	2.432
4—Schroeder	228	585	2.565

## A New Low-Floor Car Control

The increased use of low-floor cars as a means of reducing the unloading and loading time element has necessitated the development of several kinds of apparatus, among the more important of which is the control. A controller box which, together with a master controller, control switch, grid resistor, main fuse and the necessary interconnecting cables, constitute a complete equipment for this type of car, and which is known as the HLD control, has recently been placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

The controller box, shown in the accompanying illustrations, is divided into compartments, one containing three switches or circuit breakers, one containing the reverser and commutating switch and two small end compartments housing the motor cutout switches, relays and control terminals. While the maximum depth



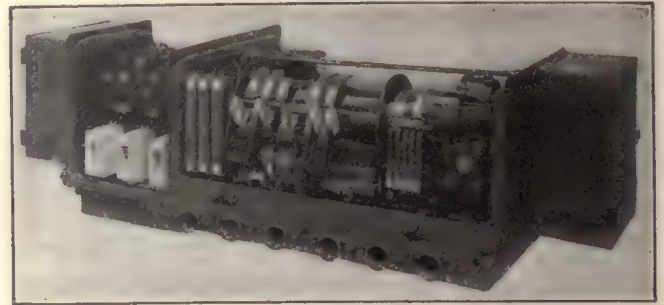
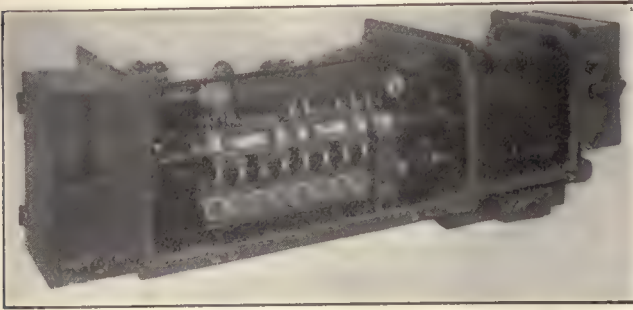
CONTROLLER BOX INCLOSED AND READY FOR MOUNTING

is over 17 in., this occurs only above the switch compartment, the top of which is only 14 in. square and extends between the sills, so that the effective depth beneath the car sills is only 14½ in.

The principal changes in main motor circuit connections, as well as the application and shutting off of power and the overload tripping features, are accomplished by three independent electric-pneumatic switches. These switches are of the HL type, which are provided with magnetic blowout. The minor changes in motor circuit connections, as required to accelerate the car, are accomplished by means of a drum type PK switch. The direction of motion of the car is controlled by a pneumatically operated reverser.

The operation of the car or train is governed by a master controller which controls the operation of the magnet valves and thus directs the movement of the switches, drum, and reverser, and regulates the operation of the motors. One master controller is located in each cab. Compressed air for operating the switches, drum, and reverser is obtained from the air-brake system through a reducing valve. The power for operating the magnet valve is taken from the line voltage through a suitable resistor. The circuits from the master controller are carried to a multi-conductor train





FRONT AND REAR VIEWS OF CONTROLLER BOX WITH COVER REMOVED SHOWING DETAILS

line from which branch circuits are run to each piece of apparatus. This train line extends the entire length of the car and terminates in receptacles at each end. The train line of any car may be connected to that of any other car at either end by means of a jumper placed in the adjoining receptacles, thus making the train line continuous throughout all cars. Operation of the master controller on any car will then operate the respective pieces of apparatus on all cars simultaneously.

The control circuits for the unit switches, operating drum and reverser are so interlocked that the sequence of operation is predetermined and the action of one part can take place only when the other parts are in their correct relation. By means of a series limit switch, the acceleration of the car may be made automatic, thus preventing excessive overloading of the motors. However, each notch in series is registered on the master controller, so that the progression of the control may be arrested at intermediate speeds when desired. The second notch is secured at will, independent of the limit switch.

Where the service requires, a compound limit switch may be supplied whereby a momentary increase above normal current may be secured by closing a push button. The master controller handle may be provided with an emergency cutout attachment, which operates contacts in the control circuit supply, and may also be arranged to apply to the brakes. The handle must be held down continuously while operating in order to maintain power on the motors.

All arcing is confined to the pneumatically operated unit switches which are designed to effectively care for this duty, leaving less attention necessary to be paid to the drum contacts as compared to that required for a standard platform controller.

This control, while primarily designed for light-weight, low-floor cars, is capable of handling two or four motors having an aggregate capacity of not over 200 hp. at 600 volts. Among the more important advantages of this low-floor car control are the following: compactness, reliability, ease of installation, light weight, low maintenance, safety, and simplicity.

### Scrap Axles Used for Forgings

The Kansas City Railway up to the time of the prevailing scarcity of forged steel, made it a practice to purchase old steam railroad axles for use in the manufacture of forgings. These axles were bought at an average price of \$20 per ton, whereas billets at that time cost from \$27 to \$28 per ton, f.o.b., Pittsburgh, Pa. These old axles contained a high carbon steel, which, if purchased by formula, would have cost the company approximately \$35 a ton. The carbon content of these axles is 0.30, which makes them a very satisfactory material for the manufacture of high-grade forgings.

### Improvements in Standard Truck Construction

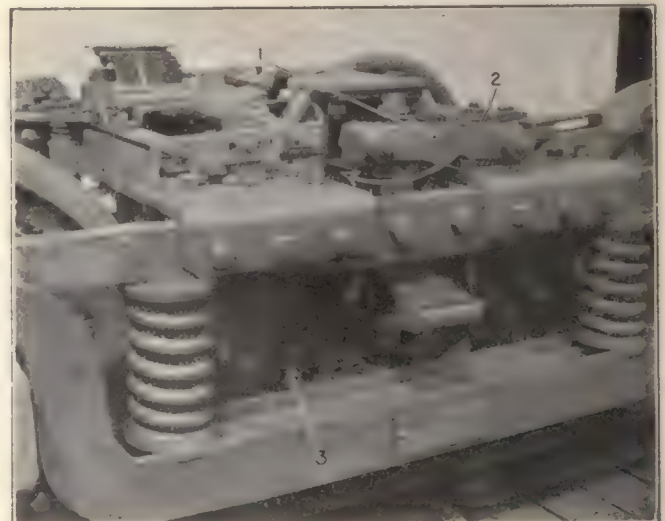
Three very important improvements in Brill truck design recently have been perfected and installed as standard on the various Brill trucks to which they are applicable. They are the side-swing dampener, the graduated spring system and the bolster guide.

The graduated spring device now is incorporated (unless otherwise requested) in the construction of all Brill motor and trail pivotal trucks, and the bolster guide is a standard part of all motor pivotal trucks. Preference is given to the block and link type of guide shown in the accompanying illustration, but in some cases there is not sufficient space to install this type, and in those cases a ball and link type is employed.

In detailing the construction and action of these new devices (which form a very important part of the Brill exhibit at the American Electric Railway Association convention at Atlantic City), a specific type of truck, the 27-M.C.B., is taken.

When the car is running free, without any effect from the brakes or acceleration of the motors, both the elliptic and the equalizing springs are free to act to cushion the car. However, in a truck of this type, not equipped with the bolster guide, when the brakes are applied the springs cease to act to a greater or less extent. This is due to the fact that when the shoes are forced against the wheels they cause the axles to spread apart and consequently press the journal boxes against the sides of the pedestal. This pressure in most cases is great enough practically to stop the action of the equalizing springs.

In order to overcome any undesirable vibration, which might extend up into the car and set up injurious



27-M.C.B TRUCK SHOWING (1) BOLSTER GUIDE; (2) SPIRAL SPRINGS FOR SPRING SYSTEM, AND (3) SIDE-SWING DAMPENER



jars and shivers through the frame of the car with the result of decreasing the length of its life, the bolster guide was designed. This device entirely replaces bolster and transom chafing plates. Its purpose is to link the bolster to the transom in such a manner that the spring action will give the bolster a vertical movement, and also that the bolster may move transversely of the truck for easement on curves. The links, however, hold the bolster in such a position that it cannot approach or move away from the truck transoms, and, therefore, since the bolster and transom or truck frame never are in frictional contact, the former practically floats on the springs and well may be termed a floating bolster.

Due to the bolster guide link being pivoted on both the bolster and the transom, the vibration in the truck frame is lost in the link, which moves up and down quickly at the end attached to the transom and merely revolves slightly on its bolster pivot, giving the car the full benefit of the action of its springs under braking and acceleration, when the spring action really is needed more than at any other time to produce smooth riding.

In trucks of the M. C. B. type which do not include as a part of their construction the graduated spring system, the elliptic springs have to be made sufficiently strong to carry the car's maximum load, in some cases more than 150 passengers. It is easy to see that a spring heavy enough to carry a load of this size would not produce the best results when only a few passengers are occupying the car. The capacity load is the exception rather than the rule, a lightly loaded car being more common, and therefore it seemed but natural to endeavor to devise some means of providing easy spring action and smooth riding under the more frequently occurring light load. This system consists of a spiral spring mounted between the top of the elliptic spring and the truck bolster. The capacity of this spiral spring is less than that of the elliptic; in fact, it is of such strength that after the seated load is in the car the bottom part of the pocket on the truck bolster contacts with the spring seat, and from that point on any additional load is borne by the elliptic spring only. Thus the spiral spring remains out of action until the passenger load again is less than the seated load, at which point it again becomes active. Thus easy-riding qualities of the truck under light passenger loads are assured.

The above descriptions show how the vertical motion of the car is taken care of by the graduated spring system and the bolster guide. However, even with the vertical motion of the car corrected so absolutely by the combination of these two devices, there remained another disadvantageous feature to be cared for. This was the side swing set up in the car in taking curves or in passing over bad irregularities in the track, which swing in many cases had a propensity for becoming very intense. This swing, before the perfection of the side-swing dampener, was possible because the upper end of the links, by means of which the elliptic springs connect the truck bolster and the transoms, are hung so that the whole link will swing sidewise under the necessary force. To check this lashing back and forth, a fairly heavy spiral spring is placed in compression at the end of the bolt supporting the casting upon which the bottom of the elliptic spring rests. The compression of this spiral spring forces the hanger link against the casting upon which the elliptic rests and sets up a friction, the amount of which can be regulated by more or less tension to suit the condition of the roadbed so as properly to handle the side swing. Thus, with this dampener installed on the truck the side swing is taken care of simply, but efficiently.

## A Recent Design of Reverse-Phase Relay

The General Electric Company, Schenectady, N. Y., has just placed on the market a new reverse-phase relay which is shown in the accompanying illustration.

This relay was designed for the protection of apparatus against accidental phase reversal caused by the interchanging of wires when repairing cables or installing additional switching apparatus. It is specially applicable for two conditions: first, where the motor operates normally in one direction only, and, second, where the motor, under normal conditions, operates in either a forward or a reverse direction by changing the phase rotation with a controller. In the first case the relay is installed as near the motor as possible, so that when current is thrown on the motor under unintentional reversed-phase conditions, the relay operates,

opens the motor switch and automatically cuts out the motor from the circuit. In the second case the relay is connected outside of the controlling apparatus of the motor, and affords protection for reversals of phase between the controlling apparatus and the source of power supply.

This relay operates on the same principle as a squirrel cage induction motor. The operating coils correspond to the stator, and a hollow aluminum cylinder, connected to the contacts, corresponds to the rotor. The cylinder or plunger does not rotate, but moves in a straight line, either up or down, depending upon the phase rotation. When one of the phases of the



REVERSE-PHASE RELAY WITH COVER REMOVED SHOWING OPERATING MECHANISM

line is reversed, the plunger moves and operates the circuit-opening or circuit-closing contacts. Both sets of contacts are equipped with toggles so arranged that there is no tendency for the contacts to open or close until the toggle has buckled, the contacts then being quickly thrown to the desired position. The type of contacts required for any installation will depend on the method of tripping out the motor switch. When contactors alone are used, circuit-opening contacts are recommended. The circuit-opening contacts are reset by hand. Circuit-closing relays are used in connection with a shunt trip on air or oil circuit breakers.

These relays are designed for two-phase or three-phase service with either current or potential windings, depending upon the amount of current and the voltage of the current. Current windings, which will cause the relays to operate on phase reversal at 70 per cent of normal current, are supplied for the following conditions: for circuits up to and including 100 amp. and 550 volts, connected in series with the line; for circuits



above 100 amp. up to and including 550 volts, connected in the secondaries of current transformers, and for circuits of 600 volts and above at all currents, connected in the secondaries of current transformers. Potential windings are supplied for circuits up to and including 550 volts, connected directly across the line and for circuits above 550 volts connected to the secondaries of potential transformers. These coils are furnished with external resistances of the proper value for the different voltages.

## Control Equipment of New Toledo Cars

**Safety, Economy and Adaptability Were Considerations in the Selection of this Equipment**

Elsewhere in this issue appears an abstract of an article by C. A. Brown giving the reasons for the selection of train control for the Toledo Railways & Light Company, Toledo, Ohio. The new cars are equipped with Westinghouse light-weight HLF control and are arranged for single-end operation. They can be operated as single cars, or several cars can be operated in train. The cars are equipped with bus lines so that all trolley poles need not be raised.

Interconnected with the control system is a door interlock automatically preventing starting until all doors

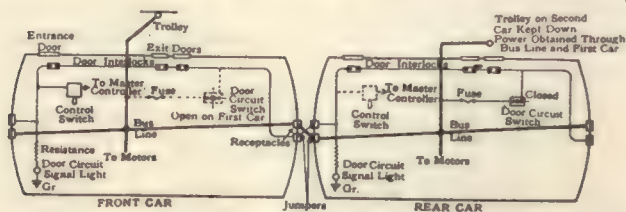


DIAGRAM OF CONNECTIONS OF DOOR INTERLOCK CIRCUIT

are closed. There is also a rear light signal indicating whether the car is standing still, starting or moving.

The connections of the door interlock circuit are shown schematically in one of the accompanying diagrams. The door circuit switch is closed only on the rear car, so that the current for the contact passes through all the door interlocks of the train in series to the master controller on the first car and thence to the control circuits. This arrangement allows the controller to be placed on the first notch as soon as the car stops, so that the car will start immediately when all the doors are closed. A signal light is also provided near the controller which, by lighting up, tells the motorman when all the doors are closed.

A slip ring is provided on the master controller which causes several of the important circuit-making

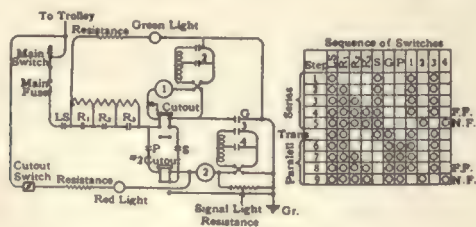


DIAGRAM OF MAIN CIRCUIT AND REAR-END SIGNAL LIGHT

At standstill the red lamp burns brightly and the green lamp is out. On the first notch the green lamp lights up and stays lit as long as power is on. As the main resistance is cut out the red light becomes dimmer; at the full series position it gets half voltage; at full parallel it is shunted out by the main circuit.

switches to open simultaneously whenever the controller handle is moved one notch toward the off position. This distributes among several switches any burning that

may occur when the controller is notched off, thus insuring a maximum life of switch contacts and arc box sides.

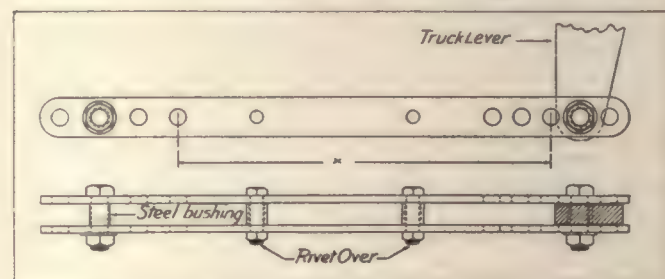
The connections of the rear signal light system with the main circuits are shown in the second diagram. When the car is standing still the circuit is completed through a red light by the resistance which shunts the No. 2 motor fields. This resistance is high in comparison with the resistance of the motor field and, therefore, does not interfere with the normal operation of the motors. During series running a green light burns also on account of closing the LS switch. During parallel running the potential across the red light, is reduced to zero, which extinguishes the red light, but the green light, being directly across the line, still burns.

The brake equipment is of the Westinghouse straight air type with an automatic emergency feature. It is possible for the conductor to set the brakes in emergency, if conditions require, through a conductor's valve. The motor-driven air compressor is of the "bungalow" type.

## Brake Lever Strut for Slack Adjusters

The Smith-Ward Brake Company, New York City, have recently developed several types of automatic shim slack adjusters to meet the requirements of the different types of trucks in service, such as Brill 27-G, Standard 0-50 and Taylor S-B.

It was desired to make a form of strut that could be used under practically all conditions, one that was light but strong, and while easily adjustable, was as free from wear, tear and rattle as could be made. The brake lever strut, shown in the accompanying drawing, has been brought out to meet these conditions. It has only two bushings, these being inside the brake lever



BRAKE LEVER STRUT FOR USE ON STANDARD TRUCKS

bushings and in the strut. The wear is transferred from the pin to the bushing, hence the bolt replacing the pin is free from wear. If desired, it can be adjusted in  $\frac{1}{2}$ -in. steps to allow for shoe and wheel wear and can be used instead of a turnbuckle if one cannot afford slack adjusters. It can be made lighter than the present struts, being riveted together and made on the principle of a built-up girder and not simply held together by the two spreaders. According to the claims of the maker, this brake lever strut is cheaper to buy in the first place and then cheaper to maintain than others.

The Ottumwa Railway & Light Company, Ottumwa, Iowa, is testing out a Collins non-splashing type electric track switch at the intersection of the Jefferson and Court Streets car lines in Ottumwa. The switch is connected so that the Court Street car motorman turns the switch his way by shutting off power and coasts through, while the Jefferson Street car motorman goes through with power on. If the tests are successful it is anticipated that others of the same type will be installed on the company's lines.



## LONDON LETTER

**Proposal Made to Curtail Glasgow Night Service—Plan to Remove Embargo on Electric Vehicles—Electric Train Service on the North London Railway**

*(From Our Regular Correspondent)*

A proposal has been made by the Glasgow Corporation Tramways committee to curtail the car service at night by an hour. The reason given is the scarcity of labor and the consequent strain on the department, which will be accentuated if the attested men still in the service are called to the army. At present nearly 600 of the traffic staff are working seven days a week. It has also been agreed to recommend that, for the duration of the war, the working hours be fixed as follows: Drivers and conductors, fifty-four hours a week; controllers and truckmen, fifty-four hours; sawyers and wood cutters, fifty-four hours; permanent-way laborers, fifty-six hours; mains and cables (laborers), fifty-six hours; red-leaders, fifty-six hours, and car works (laborers and handymen), fifty-four hours. It has also been agreed to recommend that these employees be paid time and a half for the extra hours worked between the present weekly total of fifty-one hours and the proposed working week. Another recommendation which has been adopted is that during the war male employees in the classes referred to receive a bonus of 2s. a week and female employees a bonus of 1s. a week.

Correspondence has taken place between the Board of Trade and the electric vehicle committee of the Incorporated Municipal Electrical Association with regard to import restrictions. The secretary of the committee wrote to the Board of Trade on July 7 pointing out the increasing adoption of the electric storage battery vehicle for commercial purposes, and asking that the import restrictions upon commercial vehicles be waived in respect to storage battery vehicles owing to the impossibility of obtaining such vehicles of British make. The effect upon the electric supply industry was pointed out, as was the simplicity of control of such vehicles, which enables men of military age to be released for service with the forces, as women or elderly men can become proficient in driving after but a few hours' tuition. It was pointed out also that there is at the present time only one British firm making the heavy type of commercial electric vehicle now in such demand, and it is understood that they are quite unable to cope with the orders coming to them, as they have but recently taken up this line of manufacture and are heavily involved in the production of munitions of war. It was therefore asked that there should be free importation at the present time of American-built commercial electric vehicle chassis. The Board of Trade replied on July 11 to the effect that if the committee would send a statutory declaration to the effect that the chassis it was desired to import are to be used solely for commercial purposes, the matter of their importation should have consideration.

On Oct. 1 electric train service was to commence on the North London Railway and its connections, which constitute through routes from Broad Street to Richmond and to Kew Bridge, via Hampstead Heath and Willesden. This is the first instalment of a more comprehensive scheme undertaken by the London & North-Western Railway, which includes the electrification of the lines from Euston and Chalk Farm to Watford. A small section between Queen's Park and Willesden has been in operation over a year, serving as an extension of the Bakerloo Tube, and the North-Western trains between Willesden and Earl's Court have been working electrically for more than a year. When the project is completed passengers from Watford and intermediate stations will have frequent and speedy services, with the choice of Broad Street, Euston, or the stations of the Bakerloo Tube as London destinations, so that the city and West End will be equally accessible. Between the heart of the city and Richmond a forty-minute journey without change and entirely in the open will compare favorably with the routes by the Waterloo and the City & South-Western lines, involving a change, and by the District, which is underground for a great part of the way.

The experts recently asked by the Corporation of Edinburgh to make a report on the future working of the tram-

way system in that city have stated that they propose to submit a full report in the near future. In the meantime, they have prepared a report on the methods of traction that might be adopted, keeping in view probable future extensions. The experts who were selected by the Edinburgh Corporation are: J. B. Hamilton, general manager of the Leeds Corporation Tramways; J. A. Brodie, city engineer of Liverpool, and A. H. Campbell, city engineer of Edinburgh. The chief point on which the experts were asked to report was whether it was practicable to arrange for a system of traction other than the cable so that it might become operative immediately on the expiration of the lease to the tramways on June 30, 1919. This question is answered in the affirmative, and the interim report adds that the corporation might proceed with its arrangements independently of the tramways company. Another important question asked was whether it would be advisable to adopt a new system of traction for some of the routes, retaining the cable for other routes, to which the interim report makes reply that it is desirable to have only one system. Another question asked was whether the electric system could be operated in such a way that there would be no overhead wires in the central parts of the city. The objection to overhead wires has all along been the chief reason that other systems have not been adopted. The experts reply that such an arrangement would be possible, but that it could not be put into operation immediately on the expiration of the lease, as the excavation for a conduit system would require considerable preparation and would involve interference with the running of the cable cars. It is suggested in the report that the overhead system might be introduced temporarily.

A report of the Portsmouth Corporation Tramways for the year ended March 31, 1916, has been issued by the general manager. Owing to so large a number of motormen and conductors joining His Majesty's forces, and the impossibility of obtaining suitable men to act as motormen, the car service in September, 1914, had to be reduced. Women conductors were introduced on the cars in June, 1915, but this did not overcome the difficulty of obtaining a sufficient number of motormen to improve the services, as others were still being lost, and all the male conductors, who were eligible to act as motormen, had not been trained for this position. It was not until March, 1916, that it was possible to make any improvement. At that time service during the afternoons and evenings was restored in full. The traffic revenue for the year shows a substantial increase over that of the previous year, despite the fact that considerably less mileage was run. The committee decided on July 20, 1915, to increase the bonus paid to motormen and conductors whose conduct had been satisfactory from 10s. a man each half-year to 30s. a quarter, the women conductors to receive a bonus of 10s. each half-year for general good conduct and freedom from reports.

In order to economize the coal consumption in and around London, it has been suggested by the Board of Trade that the many electrical companies should link up. A committee has been formed on which sit representatives from most of the undertakings. The body has held a number of informal meetings, and it is expected that a scheme will be formulated shortly. In the East End some of the municipal supplies are already linked up. It is said that a thousand tons of coal are being saved annually through the linking up of the Stepney and Poplar supplies. In addition to the fuel saved, there is the saving in machinery. In the case of electric railways linking up is already provided for, at least sufficiently to overcome part of the difficulty which would arise from a breakdown, though one station might not be able to supply the full demands of another added to its own load. But there are also a number of power stations operated by railways for lighting and crane and lift power, and therefore among the concerns mentioned as parties to the conference above noted are the Great Eastern, the London & South-Western and other railways, though the proposal concerns railways only incidentally.

At a recent meeting of the Leeds City Council the question of a war bonus for women conductors on the tramways was discussed. The annual cost of the increased war bonuses amounted to £8,000 or £9,000, and in spite of opposition the increased war bonus as proposed by the general purposes committee was adopted.

A. C. S.



## NEWS OF ELECTRIC RAILWAYS

### ATTEMPT TO STAMPEDE ATLANTA EMPLOYEES

**Effort Made to Intimidate Atlanta Men and Coerce Them Into Going on Strike Fails**

The Georgia Railway & Power Company, Atlanta, Ga., resumed operation of its railway lines on the morning of Oct. 3 on regular schedules in and around Atlanta, after having suspended service and ordered all cars to the carhouses at 6.30 p. m. on Oct. 2, following an attempt to stampede a strike among its men. The cars are being operated by regular employees. The company maintains that there is no strike in the true sense of that term, that rioting and other violence and the threats and other forms of moral intimidation directed against the men and the cars are the work of a lawless element which in the main has no relation even to organized labor. This element is composed almost entirely of outsiders, but includes some former employees discharged by the company during a preceding period of time and a majority of a hundred or more former electric linemen who went on strike two months ago. The linemen were unsuccessful in their attempt to coerce the company, but developed their case into the present agitation. Leading the agitators is a paid organizer of the International Brotherhood of Electrical Workers, who is quoted as saying he has been delegated by the Amalgamated Association to further its interests in Atlanta. The issue lies clearly on the one hand between those who aided and abetted by the lawless and unattached element of the city would force the carmen against their will to join the street railway union, and on the other hand the company, its men and the law-abiding public. The company's men have resisted so well all efforts to coerce them that the sole factor which governs the company's ability to render adequate service is that of sufficient protection against rioters.

At 6 p. m. on Sept. 30 without previous warning, the agitators succeeded in interrupting service temporarily by prevailing upon about thirty men to abandon their cars in the downtown section. The interruption lasted only five minutes in the longest instance. The company was prepared with reserve men from the regular forces to resume traffic at once. Rioting followed and resulted in a number of men being pulled forcibly from their cars. In the interest of the safety of its men and passengers the company finally suspended service for the remainder of the night. Service was resumed on regular schedule Sunday morning, but the rioting in the downtown sections was resumed and again was not stopped by the police. On this account at about 10 a. m. service was suspended for the remainder of the day.

At a meeting of the city police commission Sunday afternoon, citizens protested against the attitude of the police, with the result that the commission directed the police to enforce certain ordinances which had been violated and coupled the direction with the warning that non-observance of these instructions by individual officers and members would constitute inefficiency and insubordination.

Service was resumed on Monday morning on regular schedule on all lines. Violence and other forms of intimidation on the outlying sections of three lines resulted in the curtailment of service on those lines about noon. At dark the sporadic rioting of the day in the outskirts of the city and its environs became general and increased rapidly in intensity. At 6.30 p. m. the company suspended service for the remainder of the night on all lines.

The lawlessness and disorder which characterized the attempt to stampede the men was condemned at a meeting of citizens called by the Atlanta Chamber of Commerce on Monday morning. Among the leaders at this meeting was Asa G. Candler, Mayor-Elect of Atlanta. The meeting resulted in the creation of an executive committee, the individual tender by every member of his service as deputy to the Sheriff of Fulton County, and an agreement to meet each day until the situation is remedied.

### SERVICE IN NEW YORK APPROACHING NORMAL

The week just passed has served to indicate more clearly the collapse of the New York strike. The companies have continued about their orderly work and are daily approaching more nearly to the schedules in effect before the men went out. In this work they have been helped materially by the repeal on Oct. 2 of the Mount Vernon experience ordinance. This ordinance and the similar ones in effect in Yonkers and New Rochelle since 1913 hampered the companies greatly. The amendment repealing the fifteen-day experience ordinance in Mount Vernon was passed by a vote of eight to one. The Third Avenue Railway promptly resumed service in Mount Vernon following the repeal of the measure.

In Yonkers and New Rochelle the experience ordinances still stand. As a result no cars are being run there. In order to show its ability to give service in Yonkers, however, the Yonkers Railroad on Oct. 2 manned some of its cars with starters who had more than the fifteen days' experience specified in the ordinance and started operation. The disorder that followed caused the company to withdraw the cars in the interest of the safety of its patrons. There were also repeated attacks on cars in Mount Vernon. The repeal of the ordinances in these cities is being agitated. In New York City the cars are still under police protection and the wire screens which were put over the entrances to the cars at the beginning of the strike are still up.

The attempt at a sympathetic strike failed dismally. The time for calling this strike was put off and put off. When it did come on Sept. 29 some 12,000 men in other trades are said to have responded to the call. Most of these men had grievances of their own and probably would have gone out to enforce their individual demands. One of the exceptions, however, was among the workers in the breweries. These men returned to their jobs after being out twenty-four hours.

### ANOTHER INCREASE IN WAGES IN BALTIMORE.

Following the monthly meeting of the directors of the United Railways & Electric Company, Baltimore, Md., on Sept. 27, William A. House, president of the company, announced that the board, in recognition of the continued loyal and efficient services rendered by its motormen and conductors, authorized an increase in the rates of pay of these employees, effective on Oct. 1. Employees in several of the other departments will receive similar consideration. This is the fourth increase in the wages of employees of the railways since 1912. The schedule of increased pay is as follows:

Class No. 1 will comprise men who have been in the service less than one year, and will be paid 24 cents an hour.

Class No. 2 will comprise men who have been continuously in the service more than one year and less than two, and will be paid 25 cents an hour.

Class No. 3 will comprise men who have been continuously in the service more than two years and less than three, and will be paid 26 cents an hour.

Class No. 4 will comprise men who have been continuously in the service more than three years and less than five, and will be paid 27 cents an hour.

Class No. 5 will comprise men who have been continuously in the service more than five years, and will be paid 28 cents an hour.

The directors at the monthly meeting in June authorized the inauguration of a death benefit or insurance plan, to the privileges of which employees are eligible without any outlay whatever on their part, the entire expense being borne by the company. In 1914 the company also established a pension system, under the provisions of which employees retiring after a stated period are pensioned for the remainder of their lives. The company also stands the expense of this pension plan.



## SHORT STRIKE IN ALBANY

## Question of Discipline Involved—Men Finally Accept Terms of Settlement Previously Rejected

A strike of the employees of the United Traction Company, Albany, N. Y., was declared effective at 5 a. m. on Oct. 2, by the local Amalgamated Association as a means of forcing the company to meet demands of the men with respect to how the company should deal in a particular matter of discipline. On Oct. 4 the strike was declared off after an agreement had been reached to arbitrate the question in dispute.

When it became apparent that the good offices of the representatives of the company could not dissuade the men from going out the company issued a statement reviewing the history of the controversy. As previously stated the question at issue was one of discipline. The company's statement to the public follows in part:

"The only point we refused to concede was the right to discharge an employee who had willfully violated the rules and had gone by a safety stoppage point at between 25 and 30 m.p.h., narrowly missing an automobile in which were three citizens of Albany. For the safety of the public there must be rules of this nature; for the safety of the public the men who violate these rules must be disciplined. We have no desire to discharge competent and careful men; they are assets of the company; it costs money to train them and develop them; but where a man is found who is proved by reputable witnesses to be doing things that endanger the lives of citizens we claim the right to dismiss him in the interest of the public, and ask the public to stand back of us in what seems to us a most reasonable stand.

"Let the public remember this is no strike for wages. We pay high wages, wages that compare favorably with those of any other traction company in the United States and Canada. There is no complaint about working conditions. The point at issue is, shall we be forced to keep men who operate cars with reckless disregard of the rights of the public? We offered to arbitrate the matter in dispute by referring the question to the Public Service Commission. This was refused. Mr. Droogan (president of the local union) suggested instead the arbitrators who adjusted the difference of a year ago, and we gladly accepted this suggestion, but even this concession was not sufficient to avoid the strike."

The difference between the men and the officials was over section 6 of the agreement between them. The men complained they were punished for offences in a manner outside of the meaning of section 6. The company agreed to arbitrate on the specific cause, but refused to arbitrate on section 6. The men wanted a board of arbitration to pass on the meaning of the entire section, which they say is clouded.

The meeting on Oct. 4 at which the agreement to arbitrate was reached was called by the State Mediation Board. At the suggestion of Mayor Burns of Troy the officials of the company agreed to enter into the discussion of the strike with the representatives of the men. At this conference the men agreed to arbitrate, first, whether or not section No. 6 of the working agreement between the parties had been violated in handling the case of Motorman Michael J. Hurley; second, whether or not the case of Motorman Michael J. Hurley was adjudicated fairly by the officials of the company. This is the same offer that was made to the men at a conference on Sept. 29 in the office of the company. It was at that time refused and an ultimatum served on the company that a strike would follow in forty-eight hours. The signed agreement which formed the basis of settlement of the strike reads, in part, as follows:

"At the conference an agreement was reached that the following questions would be submitted to a board of arbitration, namely:

"Whether or not section 6 of the working agreement between the parties has been violated in handling the case of Motorman Michael J. Hurley;

"Second, whether or not the case of Motorman Michael J. Hurley was adjudicated fairly by the officials of the United Traction Company; and

"The following named gentlemen were selected to comprise the board of arbitration: Cornelius F. Burns, Mayor, city of Troy; Lynn J. Arnold, William E. Woollard; and that the strike be declared off and operations be resumed as soon as possible."

## BOSTON ELEVATED APPEALS TO EMPLOYEES

In connection with the presentation of its appeal for additional net revenue to a special legislative commission, the Boston (Mass.) Elevated Railway has sent a copy of its printed statement to every employee of the company, to all stockholders, heads of municipal governments in its territory and to city and town solicitors, to public service commission and college libraries, officials of local improvement associations, state officials, prominent engineers, railroad presidents, and union officials. Accompanying the statement sent to employees in each case was a letter signed by Matthew C. Brush, president of the company, expressing thanks for loyal support, emphasizing the benefits of team-play, and calling attention to the difficult financial situation now confronting the company, the investigation under way by a special commission and outlining the importance of the company's statement. The letter to the employees, dated Sept. 28, follows:

"I want to thank all the employees of the company with whom I have had any dealings for the past three years for their cordial, loyal support and co-operation, and hope that I may in the future know all the employees better than in the past.

"The success or failure of any enterprise must not only necessarily reflect credit or discredit on each and every employee, but must revert in the same proportion to the advantage or disadvantage of all. It is absolutely impossible for any man by himself to make a success of his work, and therefore the success of all of us lies in each and every employee recognizing the importance of team work and working with the common interest of all at heart.

"The public is very apt indeed to judge the company by the attitude of the employees with whom it comes in daily contact, and the courteous consideration of the car riders by all employees will go a long way toward placing the company in a proper and favorable position in securing the consideration and co-operation of our patrons which is so essential to the success of all of us.

"It is my desire to assist each and every employee of the company to make a success of his position. The difficulties which lie immediately before us are of sufficient seriousness and magnitude to warrant the keen and conservative consideration of each and every employee and officer of the company as well as all citizens of Greater Boston.

"As you know, the company is presenting at this time to the commission, consisting of the Lieutenant-Governor of the State and others, all the facts in connection with the condition of our property, and is forwarding to each stockholder of the company a copy of the statement which has been presented to the commission; and, assuming that each and every employee must be equally interested in the success of the company, we are inclosing herewith a copy of this same statement. I sincerely trust that every employee will read the statement carefully and to the extent that he sees fit permit others to read it.

"We all have three interests to conserve and protect: the investors', who have supplied the funds to make the physical property possible; the employees', whose wages must be provided and who render the service; and the car riders', who furnish the income; and I sincerely hope, and have every reason to believe, that all officers and employees will conscientiously bend every effort toward making our community justifiably proud of our transportation system, and as near a model street railway as is within our power."

## INJUNCTION AGAINST STRIKE IN MISSOURI

A temporary injunction to restrain the motormen and conductors of the Springfield (Mo.) Traction Company from striking was granted in Kansas City on Sept. 28, by Judge Arba S. Van Valkenburgh of the United States district court. The strike was scheduled for midnight on Sept. 29, at which time more than 50 per cent of the conductors and motormen were to walk out, according to the report. The threatened strike was the result of the discharge of Stanley Jones, secretary of the local carmen's union and a conductor on one of the company's lines. Jones was discharged for alleged violation of the company's rules. Following the discharge of Jones, arbitration of the matter was requested and refused, on the grounds that it was not a matter for



arbitration. Following this, the strike was called. The injunction restrains the carmen, J. H. Bisplinghoff, president of the union, and Stanley Jones, the secretary, from calling a strike, threatening a strike or inciting a strike, or striking. The grounds for the restraining order were that the strike was a violation of the agreement between the company and the union and that such a strike would seriously handicap the company and would jeopardize its franchise.

The title of the petition was the Guaranty Trust Company, New York, a corporation, and J. G. Bodell, against Division No. 691 of Springfield, Mo., of the Amalgamated Association of Street & Electric Railway Employees of America and J. H. Bisplinghoff, president, and Stanley H. Jones, secretary. The petition cites that the franchise of the Springfield Traction Company calls for the operation of cars on certain schedule time and that any failure to so operate will jeopardize the franchise and such failure to operate would afford grounds for proceedings to forfeit the rights and franchise of the company. The petition then brings in the facts which have brought about the present situation, as presented by the company:

"That Stanley H. Jones is secretary of the division No. 691 and that for weeks, in violation of the rules and the regulations of the company, persistently and continuously refused to wear the uniform of a conductor; sat among the passengers while on duty; refused to call the names of the streets; on several occasions left his car, while on duty, and rode on another car, which after making a trip, could meet the car he belonged on."

It is also alleged in the petition that Jones has admitted many of the violations. The petition sets forth that on Sept. 14, the company discharged Jones; that on Sept. 15, he requested an arbitration of the matter; that on the next day he was informed by the company that it was not a matter of arbitration; that Jones and Bisplinghoff called on the division for a strike; that the division has voted a strike and is about to declare a strike, and that unless the restraining order is granted, the division will strike. It is further set forth that the object of the strike is to nullify the contract between the company and the division.

A. F. Van Deinse, general manager of the company, is quoted as follows:

"The position of the company in this matter has always been that it has a legal and binding contract with the union, the provisions of which the company has always observed and intends to observe in the future and that the company believes that its employees should do likewise. This contract gives to the company the option of suspending or discharging any employee for the violation of any rule or regulation, and the company had discharged an employee for the violation of a number of rules on several occasions, and therefore the company held that the employee was rightfully discharged, inasmuch as he personally admitted the violation of these rules, and the company further maintains that after the employee's violation of the rules, the question of discharge was not one which could be arbitrated, and therefore the company appealed to the federal court for a writ of restraint, preventing the union from breaking its contract with the company."

#### BUFFALO FARE CASE AGAIN ADJOURNED

At the request of Thomas Penney, vice-president and general counsel of the International Railway, Buffalo, N. Y., the City Council on Sept. 29 again adjourned the hearing on the application of the corporation counsel for permission to start an action before the Public Service Commission in an effort to force the company to lower its fare on the Buffalo city lines from 5 cents to 4 cents. Mr. Penney branded the proceeding as merely a reprisal because of the company's efforts to have its special franchise assessment reduced. He denied that any excessive return on the investment was being earned by the company and refuted statements of witnesses who charged that the company had never paid sufficient taxes. Mr. Penney declared the company paid the city directly or indirectly every year more than \$1,500 for every car operated and that this year the company will pay \$250,000 in additional wages to employees. He added that for fourteen years the stockholders received no dividends. He said that a rate investigation would be very costly to the

city, and urged the City Council not to approve the recommendation of the corporation counsel.

Statistics were filed with the Council by the corporation counsel which tended to show that the net earnings of the International Railway, for the fiscal year ended June 30, 1915, were \$1,947,839, and a statement was made that if six tickets were sold for 25 cents the reduced income would be \$1,067,939, which, based on a valuation of \$17,000,000 for the company's property inside the city, would result in a return of 6.85 per cent. Other figures were filed with the Council by the city attorney with the assertion that with a 4-cent fare the railway could earn at least 7 per cent on a fair value for the properties inside the city.

In replying to the argument advanced by a witness to the effect that cheap fares prevail in Detroit and Cleveland, Mr. Penney said that 40 per cent of Buffalo city passengers were transfer passengers, thus materially reducing the average fare per passenger.

**Lecture Course on Public Utility Investment.**—The Wall Street Branch of New York University, co-operating with the American Institute of New York City, has just announced a course in public utility investment arranged as to place and hour to be convenient for active business men in the downtown district. The course will consist of thirty lectures, one each week, on Friday, beginning Oct. 6, at 25 Broad Street, New York, at 5.15 p. m. It will be conducted by Thomas Conway, Jr., Ph.D., professor of finance, Wharton School of Finance and Commerce, University of Pennsylvania, and will be an advance course, especially designed to be of service to men engaged in the financial field. Included in the course will be seven lectures on electric railways, the points to be considered being those of especial interest to the investment banker.

**Picnic of Grand Rapids Employees.**—The employees of the Grand Rapids (Mich.) Railway were the guests recently of President Benjamin S. Hanchett of the company on his home grounds, Lakewood, the force being divided so that all could attend. The men brought their families who were entertained and refreshed at the expense of the company. The number entertained on the two days was approximately 5000. The entertainment and barbecue were in charge of L. J. DeLamar, secretary and treasurer of the company. Several yearling steers were provided for the roast. The players from Ramona were transferred from that stage to one erected at Lakeside. In the evening the dancers made use of Mr. Hanchett's ballroom. There were balloon flights, fireworks and such other accessories as go to help furnish a good time. The last day of the picnic chanced to be the thirty-second anniversary of Mr. Hanchett's connection with the railway.

**Work on Buffalo-Niagara Line Progressing.**—The International Railway, Buffalo, N. Y., expects to have the new fast double-track line between Buffalo and Niagara Falls completed and in operation by July 1, 1917. Between 600 and 700 laborers will be added to the construction gangs within the next few weeks and J. W. Mack, superintendent of tracks of the company, plans to have all fills made and right-of-way graded before snow begins to fall. Tracks have already been laid for part of the distance between Buffalo and Tonawanda and between North Tonawanda and La Salle. The longest fills for the elevation of the tracks through Tonawanda and North Tonawanda have been completed and the company is now awaiting the arrival of steel for the bridges which will be erected at several points along the line. Owing to the difficulty experienced in obtaining steel for the bridges along the new line, the company has made application to the North Tonawanda Board of Public Works for permission to construct a temporary wooden bridge over Wheatfield Road.

#### PROGRAM OF ASSOCIATION MEETING

##### Electric Power Club

The Electric Power Club will hold its next meeting at the Homestead Hotel, Hot Springs, Va., Nov. 15-18. This club has as its members the officials of the companies which manufacture motors of all types. C. H. Roth, 1410 West Adams Street, Chicago, is secretary-treasurer.



# Financial and Corporate

## ANNUAL REPORTS

### Third Avenue Railway

The comparative income statement of the Third Avenue Railway, New York, N. Y., and its controlled lines, for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Operating revenue:				
Transportation .....	\$10,837,076	97.3	\$10,565,027	97.0
Advertising .....	80,000	0.7	95,250	0.9
Rent of equipment .....	18,386	0.2	16,470	0.1
Rent of tracks and terminals .....	73,210	0.6	73,441	0.7
Rent of buildings and other property .....	85,802	0.8	84,710	0.8
Sale of power .....	41,894	0.4	50,959	0.5
Total operating revenue ..	\$11,136,370	100.0	\$10,885,859	100.0
Operating expenses:				
Maintenance of way and structures .....	\$1,090,700	9.8	\$925,973	8.5
Maintenance of equipment ..	599,549	5.4	678,573	6.2
Depreciation accruals .....	294,271	2.6	562,958	5.2
Power supply .....	731,597	6.6	779,458	7.2
Operation of cars .....	2,923,776	26.2	2,914,525	26.8
Injuries to persons and property .....	659,197	6.0	602,798	5.5
General and miscellaneous expenses .....	509,100	4.5	511,890	4.7
Total operating expenses ..	\$6,808,194	61.1	\$6,976,179	64.1
Net operating revenue .....	\$4,328,176	38.9	\$3,909,680	35.9
Taxes .....	848,122	7.6	781,034	6.7
Operating income .....	\$3,480,054	31.3	\$3,178,645	29.2
Interest revenue .....	157,870	1.4	81,127	0.8
Gross income .....	\$3,637,924	32.7	\$3,259,773	30.0
Deductions from gross income .....	\$1,264,651	23.8	\$2,565,730	23.6
Net income .....	\$991,072	8.9	\$694,042	6.4

\*No additions have been made to the depreciation reserve since Dec. 31, 1915.

†Interest on certificates of indebtedness of the Dry Dock, East Broadway & Battery Railroad has not been included in the account since Feb. 2, 1908.

The income account for the system during the current year shows, after the payment of all interest, taxes and depreciation, a balance of \$991,072, an increase of \$297,029 over the preceding year. The gross earnings of the company were the largest in its history and the net earnings also exceeded those of previous years and were abnormally large. The revenue from transportation increased \$272,048 or 2.6 per cent, and the operating expenses showed a net decrease so that the net operating revenue increased \$418,496 or 10.7 per cent.

The report states that the showing made is accounted for in part by the fact that since Jan. 1 no payments were made out of the net earnings into the depreciation fund, and also by reason of the fact that the condition of the labor market made it impossible to do a good deal of work which the company was anxious to do, and some of which it was under orders from various authorities to finish by fixed dates and yet was unable to find labor to do. It is stated that the company endeavored to find responsible contractors to take part of the work off its hands, but the answer from them has been that they could not take the contract at this time under any circumstances.

In respect to the adjustment bonds, \$248,000 have been purchased by the company under the following circumstances. At the time of the purchase of the Belt Line Railway Corporation an application was made to the Public Service Commission for permission to capitalize, among other things, a certain claim which that company had against the receivers of the old Metropolitan Street Railway. The claim was rejected by the commission as worthless. In the course of time, however, the claim realized in cash \$185,000 and that sum, of course, brought the cost of the Belt Line road down by the same amount. In order to save the large amount of interest it was devoted to the purchase of the adjustment bonds. Some other money, the report states, has been and will be devoted to the same purpose, and it may reasonably be expected that

within a comparatively short time the income from these bonds, together with such supplementary sums as the company can use for that purpose, will result in materially diminishing the principal of this mortgage.

In consequence of the 4 per cent bond issue of last October and the discontinuance of cash payments into the depreciation fund after Jan. 1, dividends were begun at the rate of 4 per cent on Jan. 1 and have been continued down to the present time. On Jan. 1 wages were increased by \$90,000 a year and since then the company has felt it desirable to make a further increase of about \$150,000. Nevertheless, President Whitridge thinks that the present rate of dividends can be maintained.

During the year the company's printing plant has been in active operation, and the results show that the actual saving is \$32,000 a year, considerably in excess over the amount originally estimated.

### HITCH IN NORTHERN ELECTRIC PLAN

#### Minority Opposition Leads Reorganization Committee to Allow Foreclosure of Three Underlying Issues—Hearing Before Commission

The recent hearing on the application of the reorganization committee of the Northern Electric Railway, Chico, Cal., before the California Railroad Commission occupied several days and involved the presentation of a large volume of evidence. Representatives of the overlying bondholders attacked the proposed reorganization plan and threatened resort to legal measures unless more favorable terms were offered. Later, because of the opposition of the small but insistent minority of the holders of notes and overlying bonds, the reorganization committee reluctantly decided to allow foreclosure proceedings to be taken by holders of three issues of the underlying bonds. First mortgage liens which are to be foreclosed forthwith comprise the entire bond issue of the Northern Electric Company, amounting to \$3,770,000; first mortgage issue of the Marysville & Colusa Branch Railway, amounting to \$750,000, and the first mortgage bond issue of the Sacramento & Woodland Railway, aggregating \$750,000.

When the commission opened the case it was apparent that there was a wide divergence of views as to the values involved. The reorganization plan called for the issuance of new securities totaling \$14,800,000, while the total reproduction cost reported by Richard Sachse, chief engineer for the commission, was \$10,392,316. The securities which were proposed to be issued by the new holding company were to comprise the following: (1) First mortgage 5 per cent bonds, \$500,000; (2) second mortgage 5 per cent bonds, interest payable for the first five years only if it is earned, but bearing an absolute interest rate of 5 per cent thereafter, \$5,300,000; (3) third mortgage income bonds, \$7,000,000; stock, \$2,000,000. The plan further provided that the bonds thus issued should be pledged as security for notes on the same basis as the bonds in lieu of which they were to be issued.

Under the direction of the reorganization committee, A. S. Kibbe, consulting engineer, presented to the commission a report showing how the Northern Electric Railway could increase its operating income nearly 50 per cent during the next four years by an aggressive campaign for new business. By reducing the ratio of operating expense from 76 to 70 per cent, the net income could be raised in the first year to \$164,000, during the second year to \$184,000, during the third year to \$221,000 and during the fourth year to \$272,000. This would involve, however, the expenditure of approximately \$500,000.

At the conclusion of the hearing Commissioner Edgerton stated that the commission would first pass upon the valuation of the properties and the earning power of the railway. Then it would be up to the security holders to get together by agreement, or resort to foreclosure proceedings. In the event of a foreclosure, he said it would appear that the underlying bondholders would undoubtedly get the best part of the properties, leaving the remnants for the overlying bondholders. This announcement of the commission's attitude was made prior to the decision of the reorganization committee to allow foreclosure. Earlier comment on the reorganization plan appeared in the ELECTRIC RAILWAY JOURNAL of July 10 and Oct. 23.



## UNITED RAILROADS CAPITALIZATION CUT IN HALF

### Further Details of Reorganization Plan That Is Urged for Quick Adoption in San Francisco

The reorganization committee of the United Railroads of San Francisco, which as briefly noted in last week's issue has announced a plan involving the extinguishment of \$44,330,100 out of \$91,928,100 of capital liabilities, has asked for quick action on its proposals. The holders of the 4 per cent bonds of the company have been notified that bonds must be deposited immediately if the committee is to be placed in a position where it can undertake to prevent hostile foreclosure and receivership proceedings through the action of the holders of the underlying Market Street Cable Railway bonds and Ferries & Cliff House Railway bonds which mature this year. Pursuant to the provisions of the bondholders' deposit agreement the committee has extended the time for the deposit of bonds to Oct. 31, 1916.

Under the proposed plan, according to the full details now available, all of the physical properties, franchises, bonds and stock owned by the United Railroads, and all of the physical properties, franchises and bonds owned by the subsidiary San Francisco Electric Railways, are to be transferred to the Market Street Railway, which will thereupon become the operating company. All of the issued stock of this latter company is now owned by the United Railroads. The liabilities of the United Railroads which are thus to be readjusted and the bonds and stock of the Market Street Railway under the plan are as follows:

Present		Future	
Market Street Ry. bonds	\$7,098,000	Market St. Ry. bonds	\$7,098,000
United Railroads bonds	23,854,000	Market St. Ry. bonds	6,000,000
		First preferred stock	11,000,000
Market St. Cable Ry.	1,800,000	Market St. Ry. bonds	3,000,000
The Omnibus Cable Co.	2,000,000	6 per cent debentures	2,500,000
Ferries & Cliff House Ry.	400,000		
Sutter St. Ry.	1,000,000		
7 per cent notes	1,925,000	2d preferred stock	5,500,000
6 per cent notes	740,000	Common stock	12,500,000
5 per cent notes	1,000,000		
1st preferred stock	5,962,500		
2d preferred stock	28,200,000		
Common stock	17,948,600		
		Liabilities extinguished	\$47,598,000
			44,330,100
	\$91,928,100		\$91,928,100

From the above it will be noticed that all the underlying bonds of the Market Street Cable Railway, the Ferries & Cliff House Railway, the Omnibus Cable Company and the Sutter Street Railway, aggregating \$5,200,000, all of which bonds are now maturing or will mature during the next two years, are to be retired. The reorganization plan provides that the Eastern and other capitalists who hold the unsecured notes and stock of the United Railroads will furnish a fund for the payment of these bond issues, as and when they mature. The process by which this will be accomplished is the underwriting by the controlling California Railway & Power Company at 90 per cent of face value of a new issue of \$2,500,000 of serial debentures and also the underwriting at 90 of \$3,000,000 of Market Street Railway 5s to be taken in 1918 or before. The holders of the unsecured notes and stock of the United Railroads will receive new second preferred and new common stock of the Market Street Railway and the surrender of certain obligations as a consideration for the underwriting contract described above.

The committee believes that the foregoing plan is advantageous to the holders of the Market Street Railway 5 per cent bonds as it takes care of \$4,200,000 of bonds underlying that issue and adds to the security of those bonds the properties of the San Francisco & San Mateo Electric Railway, Sutter Street Railway, Sutro Railroad,

San Francisco Electric Railways and other property. The \$9,000,000 of Market Street Railway 5 per cent bonds to be issued includes all bonds exchanged for underlying bonds cancelled and to be cancelled.

The plan, the committee states, is as fair to the holders of the United Railroads 4 per cent bonds as the existing circumstances and conditions will permit. Besides taking care of the \$4,200,000 of underlying bonds mentioned, and the \$1,000,000 of Sutter Street bonds which underlie the United Railroads, it gives to these bondholders 25 per cent of the par value of the United Railroads bonds in Market Street Railway 5 per cent bonds and 46 per cent in the 6 per cent cumulative first preferred stock, thereby giving them new securities equal to 71 per cent of the face value of their present bonds, which are to-day selling on the market at 33 per cent of their face value. The new securities will entitle the bondholders to the same income they now receive, and will have to be paid in full before the stockholders below them receive anything in the way of principal.

In the opinion of the committee these bondholders can well afford to let the equities behind 71 per cent of the face value of their present bonds go to the present note-holders and stockholders in consideration of the latter financing the underlying bonds as proposed in the plan and surrendering all of their notes and also their claims to an interest in the property or to any equitable consideration which they might assert in the event of foreclosure proceedings on account of the fact that in 1906, at the time of the disaster, they paid in \$5,000,000 in cash for the rehabilitation of the property, and because in December, 1912, they loaned the company \$1,550,000 for the particular purpose of paying \$1,200,000 of Market Street Cable Railway 6 per cent bonds and \$350,000 of Park & Cliff House Railway bonds which matured Jan. 1, 1913, and on account of which there are \$1,550,000 of Market Street Railway 5 per cent bonds now unissued in the possession of the trustee and which it is proposed under the plan to transfer to the United Railroads bondholders.

Unless such a reorganization is brought about, the committee avers, a general foreclosure of all of the mortgages and a receivership seem inevitable. If a suit should be brought on the underlying bonds which mature this year, and a receiver should be appointed by the court, it would probably result in all of the other bond mortgages being foreclosed in the same suit, the property being sold as a whole and the proceeds distributed upon equitable principles among the various classes of bondholders and creditors, in accordance with the value of their various and respective security and interests. Owing to the number of bond mortgages now existing and the different portions of the properties upon which they are liens, it would be difficult to determine the respective values of the several classes of bonds and to what extent these various bonds might be used in payment of the properties at foreclosure sale, and a long and expensive litigation would or might ensue.

In view of these conditions, the committee concludes, it would seem that, even if foreclosure proceedings should be brought, it would become advisable, sooner or later, for all of the various bondholders, creditors and stockholders to come together and agree upon some plan of reorganization for the protection of their various interests and for the purpose of taking the controversy out of the courts and receivership, and it would therefore appear to be obvious that every effort should be exerted at the present time to come to an immediate agreement upon a plan of reorganization and save the properties from the results of such receivership and prolonged and expensive litigation.

**Boston (Mass.) Elevated Railway.**—The West End Street Railway has petitioned the Massachusetts Public Service Commission for the right to issue 12,000 shares of common stock, the proceeds of which will be used to reimburse the Boston Elevated Railway for improvements, etc. Of the 12,000 shares 4300 have been authorized by the stockholders and the remaining 7700 shares will be authorized at the annual meeting on Nov. 28.



**California Railway & Power Company, San Francisco, Cal.**—In issuing checks for a dividend of 1 per cent on the prior preference stock of the California Railway & Power Company, notice has been given of the reorganization committee acting in the case of the controlled United Railroads of San Francisco, the plan of which committee is described in another column. While the United Railroads hitherto has paid the interest regularly upon its notes held by the California company, it is said to be unlikely that it will be able to make remittance on this obligation during the period of its reorganization. In spite of this fact the directors of the California Railway & Power Company decided to pay the current dividend as they had the money on hand.

**Cities Service Company, New York, N. Y.**—The directors of the Cities Service Company have authorized the issuance of \$8,000,000 of preferred stock and \$118,800 of common stock, for the purchase of the capital stock of the Crew Levick Company, Ponca Refining Company, Cushing Refining Company and the Producers Refining Company. These properties will be subject to a bonded indebtedness of approximately \$5,500,000. The policy of City Service Company has been to pay no cash dividends on the common stock in excess of 6 per cent, but to reinvest all earnings in excess of this amount. To insure that this policy will be carried out it is proposed to amend the articles of incorporation.

**Empire United Railways, Inc., Syracuse, N. Y.**—The Bankers' Trust Company, New York, N. Y., has received \$15,000 from the estate of Clarence W. Seaman as a guarantor of \$681,900 of one year secured notes of the Empire United Railways, Inc., due on Feb. 16, 1916. The total of the obligations of the Seaman estate on this account is \$81,119 with accrued interest. It is announced that the Seaman estate will pay this amount, but that the executors have been handicapped in settling the estate. The Empire United Railways securities involved in the matter are successors to short-time notes of about \$1,000,000 in face value issued originally by the Rochester, Syracuse & Eastern Railroad. The issue became due on Feb. 16, 1915. Under a plan then agreed to holders of \$1,000 notes received about \$275 in cash, two \$100 bonds of the Empire United Railway and new short term notes issued by the consolidated company and guaranteed by signers of the original issues. Following the default on the new notes on Feb. 1, 1916, as to principal and interest the Bankers' Trust Company requested the guarantors of the notes to make good their obligation. All but four of the guarantors promptly made their payments and in March the Bankers' Trust Company distributed to holders \$633 on each note of the original par value of \$1,000.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—The Oakland, Antioch & Eastern Railway has just completed its third year of operation as an interurban electric system. While a detailed comparison has not been made, it is stated that this is the only electric system in the State showing an increase in freight and passenger revenue for the fiscal year ended July 1, 1916. This condition is largely due, it is pointed out, to the fact that the road has had very slight jitney competition. The following comparative table for years ended Aug. 31 indicates the ratio of increase in business: Passenger revenue—1914, \$374,267; 1915, \$457,523; 1916, \$497,707; freight revenue—1914, \$59,005; 1915, \$61,447; 1916, \$96,528; passengers carried—1914, \$572,773; 1915, \$650,047; 1916, \$750,869.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—The St. Joseph Railway, Light, Heat & Power Company has executed a first and refunding mortgage for \$15,000,000 to the Bankers' Trust Company, New York, N. Y., and the Mississippi Valley Trust Company, St. Louis, Mo., as trustees, given to secure 5 per cent thirty-year gold bonds, the proceeds of which are to be used to retire \$5,000,000 of its first mortgage bonds and \$326,000 of first mortgage bonds of the St. Joseph & Savannah Interurban Railway now outstanding and for other corporate purposes.

**Sapulpa & Interurban Railway, Sapulpa, Okla.**—The final transfer of the property of the Sapulpa & Interurban Railway from the hands of the receiver to Charles Williams, St. Louis, who recently purchased it at receiver's sale, has been made with the approval of the

court and the filing of the record. No changes are contemplated in the management. Mr. Williams is understood to be acting for the Midland Valley Railroad, an operating steam railroad.

### DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.  
 Boston (Mass.) Suburban Electric Companies, quarterly, 50 cents, preferred.  
 Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.  
 Citizens' Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.  
 Detroit (Mich.) United Railway, quarterly, 1¼ per cent.  
 Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.  
 Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.  
 Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 1¼ per cent, preferred.  
 Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.  
 Tri-City Railway & Light Company, Davenport, Iowa, quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.  
 United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.  
 Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred; monthly one-half of 1 per cent, common.

### ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, ME.						
Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income	
1m., Aug. '16	\$53,860	\$30,000	\$23,860	.....	.....	
1 " " '15	51,882	\$27,561	24,321	.....	.....	
AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.						
1m., Aug. '16	\$198,214	\$125,332	\$72,882	\$35,933	\$36,949	
1 " " '15	189,975	\$120,667	69,308	98,145	\$21,122	
2 " " '16	407,244	\$254,767	152,477	72,051	80,426	
2 " " '15	377,463	\$241,392	136,071	73,047	63,024	
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., Aug. '16	\$910,429	\$689,838	\$220,591	\$98,634	\$144,667	
1 " " '15	796,220	\$506,578	289,642	98,145	\$214,122	
2 " " '16	1,842,935	\$1,277,293	565,642	197,268	\$414,928	
2 " " '15	1,602,703	\$981,569	621,134	196,410	\$470,531	
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.						
1m., July, '16	\$172,935	\$100,904	\$72,031	\$36,280	\$35,751	
1 " " '15	174,092	\$107,635	66,457	35,917	\$30,540	
12 " " '16	1,902,376	\$1,200,898	701,478	436,822	264,656	
12 " " '15	2,132,940	\$1,236,432	896,508	433,219	463,289	
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.						
1m., Aug. '16	\$445,555	\$206,622	\$238,933	\$215,051	23,882	
1 " " '15	427,195	\$191,113	236,082	212,032	24,050	
2 " " '16	894,650	\$410,393	484,257	429,349	54,908	
2 " " '15	855,109	\$381,044	474,065	423,239	50,826	
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.						
1m., Aug. '16	\$46,027	\$45,074	\$953	\$58,019	\$15,965	
1 " " '15	40,621	\$41,327	\$706	\$5,842	\$15,036	
2 " " '16	96,072	\$89,579	6,493	\$14,034	\$15,374	
2 " " '15	83,232	\$84,614	\$1,382	\$14,187	\$11,713	
RHODE ISLAND COMPANY, PROVIDENCE, R. I.						
1m., Aug. '16	\$587,474	\$369,299	\$218,175	\$120,714	\$99,067	
1 " " '15	511,492	\$349,743	161,749	120,284	\$42,852	
2 " " '16	1,156,749	\$740,800	415,949	241,403	\$177,667	
2 " " '15	983,640	\$669,158	314,482	240,568	\$76,600	
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., Aug. '16	\$849,966	\$525,187	\$324,779	\$144,734	\$180,045	
1 " " '15	798,901	496,687	302,214	145,697	156,517	
8 " " '16	6,740,241	4,187,967	2,552,274	1,143,167	1,409,107	
8 " " '15	6,196,934	4,028,822	2,168,112	1,131,830	1,036,282	
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.						
1m., Aug. '16	\$21,076	\$21,872	\$796	\$1,863	\$2,657	
1 " " '15	24,718	\$22,182	2,536	1,598	\$970	
2 " " '16	44,201	\$44,271	70	3,678	\$13,694	
2 " " '15	50,734	\$44,900	5,834	3,188	\$2,708	

\*Includes taxes †Deficit. ‡Includes non-operating income.  
 §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad not credited to income of that company.



## Traffic and Transportation

### JOPLIN ABANDONS TRANSFER MOVE

**Companies' Explanation of Their Inability to Meet Proposed Demand Accepted by the City**

A move to have a universal transfer system established on the railways in Joplin, Mo., was abandoned on Sept. 20, by J. F. Lee, commissioner of public property and public utilities, and Mayor McIndoe after a conference with W. A. Satterlee of the Joplin & Pittsburgh Railway and D. C. Morris, representing the Southwest Missouri Railroad. E. F. Cameron, city attorney, also attended the conference. Mayor McIndoe and Mr. Lee said they would not take the matter before the Public Service Commission of Missouri because they had faith in the arguments presented by the railroads against the plan.

The Southwest Missouri Railroad's case was explained in a letter received by the Mayor from A. H. Rogers, president of the company, as follows:

"You have requested that the Joplin & Pittsburgh and the Southwest Missouri Railroad companies inaugurate a system of inter-company transfers in Joplin, so that a passenger can board a car on either line and by transfer ticket be carried from any point within the city on either line to any point within the city on the other line.

"The two street railways are entirely separate and distinct organizations and each is giving universal transfers within the city to its own passengers, and I cannot see any good or valid reason—or justice—in the request that their transfer privileges be enlarged so as to include inter-company business. The result would be that the fare received by either company from each passenger transferred from one line to the other would be only 2½ cents. This means a 50 per cent reduction in said fares and would entail a loss on each passenger so transferred. The street railways of the country are all suffering from largely increased costs of operation without any corresponding increase of income, and the situation in Joplin is the same as elsewhere. The amount received here per passenger is the same as it was twenty years ago, and the cost of transporting each passenger has increased significantly.

"At present the Southwest Missouri Railroad is under contract to do a large amount of street paving in Joplin and other cities along its lines, which will entail an expenditure of more than \$100,000. This money must all be paid out of earnings. No bonds can be issued for this purpose, as no increase of business or revenue will result from these street improvements. In fact, a loss of business to jitney competition may be anticipated.

"The loss of revenue that would result from inter-company transfers is something that neither company is in a position to bear, and is something the like of which would hardly be requested from any other line of business in your city.

"Therefore, I desire to advise you that I cannot, consistently with my duties as I see them, voluntarily comply with your request, and I trust you may regard your two street railways as good fellow citizens and carefully consider the hardships under which they are already laboring, and not add anything to their existing burdens. In the day of \$100 jack their volume of business temporarily was largely increased, but now it is getting down to its ordinary basis and the companies are compelled to practice every possible economy consistent with the necessary costs of operation, which seems still to be mounting higher and higher. They are not asking any increase in their rates of fares, which is now the prevailing custom with railroads and other public utilities, but do ask that the present low rates be not revised downward.

"Street railway fare in Joplin is one of the few things that has remained stationary in these days of almost universal advanced prices and costs of living."

Mr. Satterlee told the conferees that it costs his company more than 4 cents for each passenger hauled in the city.

### ROCHESTER COMPANY COMPLYING WITH DECISION

**Report of Commission Inspector Shows That New York State Railways are Meeting Requirements of Jitney Decision**

The Public Service Commission for the Second District of New York has approved a report of Charles R. Barnes, electric railway inspector, which shows that the Rochester lines of the New York State Railways have complied or are complying with all but two of the minor recommendations for improvements imposed on the company by the commission, following denial of permission to operate independent jitney buses in competition with the electric railway in Rochester.

The two minor recommendations which the report shows the company is disinclined to follow are the connection of the Lake Avenue and Dewey Avenue lines through Ridge Road and new trackage in Mount Hope Avenue. The commission holds these recommendations in abeyance pending the study of the transportation situation in Rochester now being made by an engineer in the employ of the Rochester Chamber of Commerce.

The other recommendations of the commission will provide a seat for every passenger in Rochester throughout the day, through additions of equipment, re-routing cars, installation of additional facilities and the elimination of cases of delay. These involve large amounts of new construction and rearrangement, and it is estimated that the total cost of the improvements now under way will be more than \$1,000,000.

An interesting feature of the development is the entrance of the railway into the jitney field itself. As the north side cross-town line recommended by Mr. Barnes cannot be built until the city builds a new bridge over the Genesee River, the company proposes to cover this route by motor buses running on a fifteen-minute headway during the day with increased rush-hour service, and affording transfer facilities at a slight cost between the seven north and south trolley lines which the bus route will cross. The fare on the buses will be 5 cents, without transfer privilege, but transfers will be issued from one north and south railway line to another, good on the second line after crossing town via the bus. The buses will run a total distance of 2½ miles.

The fifty new cars which the company will operate were ordered last April for delivery early this fall, but the condition of the steel market at present indicates that the cars will not be delivered before next month. These cars are of the latest design, light weight, four motor, single and prepayment type, with front and rear entrances and center exists and will seat fifty-two passengers each.

The decision of the commission in the Rochester jitney case, far-reaching in its importance, was reviewed at length in the *ELECTRIC RAILWAY JOURNAL* of May 20, page 957.

### HEARING ON BERKSHIRE THROUGH CONNECTION

The Public Service Commission of Massachusetts held a hearing at Boston on Oct. 3 upon the petition of residents of Westfield, Huntington and other towns of the Berkshire district that the Berkshire Street Railway be required to place its Lee-Huntington line in operation. Clinton Q. Richmond, general manager of the company, stated that the company was greatly disappointed at not being able to obtain a location several years ago from North Blandford to Westfield in place of the existing route from North Blandford to Huntington. Consequently the company was obliged to build its line over an unsatisfactory 5-mile route, whereas the preferred route was much easier. Until the company felt assured that it could operate safely over these long grades it could not undertake to render service over the Blandford-Huntington section, especially in view of the severe climatic conditions. The Lee-Huntington line represented an investment of about \$3,000,000. The company had undertaken to operate sections of the line running eastward from Lee. Mr. Richmond said that the construction difficulties were perhaps not fully appreciated by the petitioners. The company did not believe that it would be feasible to haul loaded freight cars over the Blandford-Huntington section of the line. Even for



a passenger service and light express traffic it would be necessary to install a substation to feed the middle portion of the mountainous route. About 13 miles of line are under operation at present, while 10 miles are not in service. If the commission ordered service to be established between Lee and Huntington, the company would be obliged to inaugurate it as soon as safe operating conditions could be assured. About \$19,000 would have to be expended before the line could be opened for operation from terminal to terminal.

Mr. Richmond said that the financial condition of the company had an important bearing upon the opening of any further lines. The investment of the New Haven company in the Berkshire system is \$11,298,820, and the public owns underlying bonds amounting to \$1,500,000. The gross earnings of the system for the year ended June 30, 1915, were \$952,868; operating expenses were \$802,759; net earnings, \$150,109; taxes, \$61,679; balance, \$88,430; interest on bonds in the hands of the public, \$69,000; balance for bonds owned by the New Haven, \$19,430. During the last fiscal year the New Haven company not only received no adequate return for the bonds and notes held by it, but, in addition, had to advance \$216,272 to make needed additions and betterments to the property to keep it in reasonable condition. For the ten months ended April 30, 1916, the results were only slightly better, the property not earning enough to pay the interest on the bonds owned by the public and by the New Haven, amounting to \$2,346,000. The commission took the case under advisement.

#### TOWNS AND CITIES HELD TO BE SINGLE-FARE PASSENGER UNITS

That towns and cities in Indiana through which interurban lines are operated are passenger units and that no more than 5 cents fare can be charged within the limit of the unit is held by the Public Service Commission of Indiana, which has decided a case at Elkhart, through a letter written by Charles A. Edwards, a member of the commission, to the Rev. F. J. Jansen of Elkhart.

Mr. Edwards stated that the Elkhart situation was the only case of its kind that he knew of in Indiana. He said that in all towns and cities of the State a fare of 5 cents is charged for all travel within the limits of the town or city. Whether the passenger boards the car some distance from the central station of an interurban company in any city or town, or whether he boards it at the station, makes no difference in his fare from that city to another city and makes no difference in the 5-cent fare charged between points in the same city. If the passenger leaves the car beyond the central station of an interurban company, but still within the city or town limits to which he has paid his fare, Mr. Edwards said, no additional charge can be made.

The Rev. Mr. Jansen had complained to the commission that the interurban car on which he was accustomed to travel to the rectory of the church stopped at the Elkhart interurban station, and that the conductor insisted on collecting an additional fare from him if he rode the few blocks to the rectory, beyond the central station. The Chicago, South Bend & Northern Indiana Traction Company, which operates the interurban line in question, showed that it had filed its tariffs with the commission on the basis of the "penny zone," and had based its rates on 1 mile zones within the city limits of Elkhart at the rate of 2 cents per mile.

In his letter to the company requesting that they rearrange their tariff Mr. Edwards stated that the city through which the interurban operated should be taken as a unit, and no additional charge should be made for carrying the passenger beyond the central station, as long as his stop was within the corporation limits. Mr. Edwards said that he had submitted the question to the commission and was upheld in his decision. Under this ruling, a passenger taking a car at Goshen, for example, and riding to the central station at Elkhart, would, if he so desired, be able to continue his ride to a further point in the city of Elkhart on a through interurban car without payment of any additional fare.

**Railway to Operate Gasoline Launches.**—The Evansville, Suburban & Newburg Traction Company, running out of Evansville, Ind., will put two gasoline launches into service on the Ohio River, to ply between Newburg, Ind., and Owensboro, Ky. This will give the people of the Owensboro direct connection with Evansville. A through rate will be quoted.

**Twenty-five Year Jitney Grant Discussed.**—At a recent informal meeting of the City Council of Portland, Ore., the proposition of issuing a franchise for a period of twenty-five years to a jitney company was discussed, and was referred to Commissioners Daly and Dieck. F. T. Griffith, president of the Portland Railway, Light & Power Company, was present at the meeting and protested against the granting of the franchise unless regulations were inserted similar to those imposed on his company.

**Buffalo Line Handles Peaches.**—The International Railway, Buffalo, N. Y., is operating four express fruit trains each way daily between Buffalo and Olcott Beach. The line bisects the famous Niagara County fruit country where hundreds of thousands of bushels of peaches are marketed annually. Large electric locomotives are used to haul the trains over the interurban lines and in most cases the International box cars are used. Fruit for shipment long distances is packed in railway refrigerator cars and turned over to the trunk line railroads at Lockport and Buffalo.

**Dallas Jitneys Decrease in Number.**—There were 331 jitneys in operation on the streets of Dallas, Tex., on Sept. 26, according to the report of City Automobile Inspector Birthright to Police Commissioner Winfrey. This is a decline of twenty-four jitneys for one week, as the report for the preceding week showed 355 jitneys in operation. There has been a marked decrease in the number of jitneys recently, the number dropping from more than 500 to 331 in a few weeks. Many licenses are expiring now and comparatively few of these are seeking a renewal of their grants to operate.

**Plea Entered to Abandon Line.**—Ansel M. Easton, who owns and operates the Burlingame (Cal.) Electric Railway, has filed with the Railroad Commission of California an application for authority to abandon the railway, claiming it has never paid expenses, and during the last year has lost \$3793.58. Mr. Easton obtained a franchise for the railway in 1911, and built a single-track line running from Broadway to Hillside Drive and Vancouver Avenue. The cars were operated by storage battery and the fare has been 5 cents. Mr. Easton says that he will pave the right-of-way upon removal of the tracks, and he wants the commission to declare his rights to operate the line forfeited.

**Failure to Live Up to Traffic Rules Alleged.**—The Public Service Commission of Maryland has adopted an order requiring the United Railways & Electric Company, Baltimore, Maryland, to meet the service requirements promulgated by the commission recently. The commission states that on May 29, it adopted rules for the regulation of traffic, and for "the comfort, convenience and safety of the public," especially with reference to the carrying capacity of cars; and that from checks made by the commission's transportation expert and from numerous complaints from citizens, it appears that the rules "are not being observed as they should be, and as the public and the commission are entitled to expect and demand."

**Board of Trade Protests Jitney Competition.**—The Hollywood Board of Trade has registered with the City Council and the Public Utilities Board of Los Angeles, Cal., a resolution protesting against the jitney bus competition existing under present regulations. The Hollywood organization asks that jitney permits be limited to streets in Hollywood that are not now served by the Pacific Electric Railway and to streets that will open up new service territory. The resolution calls attention to the part the Pacific Electric Railway has taken in building up the community, and also to the large investment the railway has made, particularly in street paving and in payment of taxes. The Council has referred the resolution to the Public Utilities Board.



## Personal Mention

**J. F. Henning** has resigned as superintendent of materials and supplies of the Chicago (Ill.) Surface Lines to become assistant general manager of the Vesta Accumulator Company, Chicago.

**C. B. Hammond**, chief clerk of the Elmira, Corning & Waverly Railway and the Corning & Painted Post Street Railway, Elmira, N. Y., has been appointed general agent of both companies. Mr. Hammond has been with the companies since October, 1909.

**S. B. Irelan**, manager of the City Light & Traction Company, Sedalia, Mo., was presented with a handsome gold watch by the employees of the Bartlesville, (Okla.) Interurban Railway when he returned to Bartlesville recently for a visit. Mr. Irelan was formerly manager of the property at Bartlesville.

**W. L. Wuster**, chief clerk in the payroll and distribution department of the Chicago (Ill.) Surface Lines, has been appointed superintendent of materials and supplies of the company to succeed J. F. Henning, resigned. Mr. Wuster was born in Chicago in 1888 and after completing his education in the public schools took a course in electrical engineering at Armour Institute of Technology, Chicago. In 1907 he accepted a position with the Chicago City Railway as street timekeeper in the track department. In 1909 he was made time distribution clerk in the track department, and in 1912 he was appointed chief clerk of the payroll and distribution division of the Chicago City Railway.

**John A. Clay**, who has been elected president of the Colorado Electric Light, Power & Railway Association, is the general manager of the Western Colorado Power Company, with headquarters at Montrose, Col. Mr. Clay was graduated sixteen years ago from the engineering department of the University of California. His first position in the central station field was with the Independent Light & Power Company, San Francisco. Later he entered the employ of the Pacific Mail Steamship Company in its San Francisco-to-China service. Shortly thereafter, however, he took up construction work ashore for the General Electric Company in the Northwest. Entering central station work again he was employed by the Tacoma Railway & Power Company and the Washington Water Power Company. Then for a period he was connected with the Hecla Mining Company in the Coeur d'Alene district. Since 1906 Mr. Clay has been with the Western Colorado Power Company of Montrose, remaining through various reorganizations.

**A. L. Langdon** has retired as traffic manager and general freight agent of the Long Island Railroad under the pension rules of the company, after nearly fifty-three years of continuous service with the Cumberland Valley, Pennsylvania and Long Island Railroads. With the retirement of Mr. Langdon the position of traffic manager will be discontinued, but the duties of that office will be performed by the general freight agent and the general passenger agent, who will report directly to the president. Mr. Langdon was born seventy years ago at Sugar Grove, Pa. He was educated at the Randolph Academy, from which he was graduated in June, 1863. He entered the service of the Pennsylvania Railroad in November, 1863, as a clerk at Corry, Pa. On June 15, 1903, he was transferred to the Long Island Railroad as general freight agent, and on Feb. 1, 1905, he was promoted to traffic manager of the Long Island Railroad. Donald Wilson, formerly special agent in Mr. Langdon's office, will be advanced to the position of general freight agent of the Long Island Railroad.

**M. J. Feron**, in addition to his duties as general superintendent of transportation of the Chicago (Ill.) Elevated Railways, has been appointed superintendent of transportation of the Chicago, North Shore & Milwaukee Electric Railway. J. W. Simons, the present superintendent of that road, will report to Mr. Feron. Mr. Feron has been connected with the elevated railway systems of Chicago for about twenty-

two years. Previous to that he was for several years with the Chicago & Northwestern Railway as yard master. Mr. Feron entered the employ of the Metropolitan West Side Elevated Railway of Chicago as switchman, and since has served as dispatcher, train master and superintendent of that road. With the consolidation of the operating staffs of all the elevated railways in Chicago in the fall of 1911 Mr. Feron was appointed general superintendent of transportation. His duties are now extended to cover the 186 miles of high-speed, double-track suburban and interurban road connecting Chicago and Milwaukee.

**B. J. Fallon**, engineer of maintenance of way of the Chicago (Ill.) Elevated Railways, has been appointed chief engineer of the Chicago, North Shore & Milwaukee Electric Railway. He now has jurisdiction over the way and structures departments of all of the Chicago elevated lines, and will have charge of all of the engineering work on the double track interurban line which connects Chicago and Milwaukee. J. S. Hyatt, engineer of maintenance of way of the Chicago, North Shore & Milwaukee Electric Railway, will remain in charge of the way department, reporting to Mr. Fallon. Mr. Fallon graduated from De LaSalle Institute, Chicago, in 1890, and began work with the Chicago, Burlington & Quincy Railroad, in whose service he spent eight and one-half years, during which time he served as rodman, assistant maintenance engineer, locating and construction engineer, division engineer, Chicago division; assistant engineer and superintendent of track elevation at Chicago. In 1907 Mr. Fallon was appointed engineer of maintenance of way of the Metropolitan West Side Elevated Railway in Chicago, and in March, 1910, he was made assistant general manager of that road. With the consolidation of the operating staffs of all of the elevated railways in Chicago in the fall of 1911, Mr. Fallon was appointed engineer of maintenance of way of the Chicago Elevated Railways.

**Thomas Penney**, former president and for several years past general counsel of the International Railway, Buffalo, N. Y., has been elected a vice-president in addition to E. J. Dickson. This is a newly created position. Mr. Penney resigned as president of the International Railway and the International Traction Company in January, 1913, but continued as a director of the companies. He is a member of the firm of Norton, Penney, Spring & Moore, attorneys. Mr. Penney was born in London, England, and came to this country when a boy. He prepared for college at Williston Seminary, East Hampton, Mass., and after completing the academic course at Yale he took a law course of two years, graduating with the degree of Bachelor of Arts and Bachelor of Law and was admitted to the bar of Connecticut. In 1889 he began the practice of law in Buffalo and in 1895 became first assistant to the district attorney, which position he occupied for four years. A vacancy then occurred in the office of district attorney and Mr. Penney was appointed to fill that office. The following year he was elected to that office for a term of three years. He declined a renomination, and resigned, having become a member of the firm of Norton, Penney & Sears. Mr. Penney served as president of the local railway in Buffalo from 1908 to 1913.

## OBITUARY

**Leigh Stanley Bache** died on Sept. 26. He was first vice-president and general manager of the Bound Brook Oilless Bearing Company, Bound Brook, N. J.

**George E. Hill**, a leader of the Fairfield County Bar, formerly president of the State Bar Association, and many times honored by selection to various offices, died at Bridgeport, Conn., on Sept. 30, in his fifty-second year. He had served for two years as a trustee of the Connecticut Company, which took over the electric railway holdings of the New York, New Haven & Hartford Railroad.

**James Lumsden**, treasurer of the Lumsden & Van Stone Company, steam piping engineers and contractors, Boston, Mass., died suddenly near Bingham, Me., on Sept. 25. Mr. Lumsden had been in poor health for two years. Besides his connection with the Lumsden & Van Stone Company, Mr. Lumsden was a director of the Federal Trust Company and was also prominent in Masonic affairs. He was fifty-two years of age.



## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

### RECENT INCORPORATIONS

\***Carolina Southern Railway, Orangeburg, S. C.**—Incorporated to construct a standard gage railroad from Orangeburg to Estill, S. C., about 60 miles. Electric or steam power can be used. Capital stock, \$30,000; maximum \$1,000,000. Incorporators: J. Leroy Dukes, Orangeburg; E. N. Mittle, Bowman, and W. C. Martin, Branchville.

### FRANCHISES

**Henderson, Ky.**—The City Council of Henderson passed the new street car franchise on its first reading. Several changes were made in the ordinance as to fares, routes and time to make required repairs, in the event that the Henderson Traction Company becomes the purchaser: The new franchise is to continue for twenty years.

**Moncton, N. B.**—It is reported that this company has asked the City Council for a franchise to construct an extension of its line from the present terminus on John Street to the corner of Wilbur and Union Streets.

**Portland, Ore.**—A franchise granting the right to operate street cars over the interstate bridge across the Columbia River between Vancouver, Wash., and Portland, Ore., has been granted to the Portland Railway, Light & Power Company by the Pacific Highway Bridge Commission. By the conditions of the franchise, the Company is to maintain a thirty-minute schedule from 6 a. m. until 11.30 p. m. and payment to Multnomah County, Ore., and Clarke County, Wash., will be one-half of the profits of the company over operating expenses. The company will be obliged to install wires, poles and conduits for the operation of cars, and to maintain the tracks on the bridge, without expense to the counties.

### TRACK AND ROADWAY

**Mobile, Volanta & Pensacola Railway, Mobile, Ala.**—This company, which was formerly the Mobile & Baldwin County Railroad, proposes to construct a 40-mile extension east to Pensacola, Fla. It is stated that the company will issue \$100,000 bonds to secure funds for carrying out the work.

**Pacific Electric Railway, Los Angeles, Cal.**—This company will reconstruct its tracks on Santa Monica Boulevard, Sawtelle. New ties and the latest type of heavy T-rails will be laid and the pavement will be of asphalt with concrete base. Cobblestones will be laid against the rails.

**Central Florida Interurban Railway, St. Cloud, Fla.**—Right-of-way has been secured for most of the route of this company's proposed line from St. Cloud to the East Coast and to points in central Florida, and it was expected that surveys would be begun on Oct. 1. William Hall, St. Cloud, secretary. [Sept. 23, '16.]

**Boise (Idaho) Railroad.**—Work will soon be begun by this company on the reconstruction of its track on Warm Springs Avenue. A new concrete base will be laid under the track and 60-lb. rails will be used.

**Pocatello Traction & Interurban Railway, Pocatello, Idaho.**—According to reports, the Pocatello Traction & Interurban Company is considering the extension of its lines to the upper Snake River Valley, and on to Rexburg. The Rexburg Commercial Club is agitating the proposition. Clark Gibson, Pocatello, secretary of the company, has been delegated to find out the sentiment in the communities through which the proposed line will pass.

**Lee County Central Electric Railway, Amboy, Ill.**—This company's line south of Ashton, extending to Amboy, has ceased to be operated as an electric road and the wire has been sold. The road is now being operated by steam. It is stated that the line will be extended from Amboy to Reynolds Church.

**Illinois Traction System, Peoria, Ill.**—This company has announced that it will make a number of improvements in its track and roadway in and near Catlin.

**Union Traction Company of Indiana, Anderson, Ind.**—The Public Service Commission of Indiana has granted the Union Traction Company an extension of time until Nov. 1, 1917, to complete the installation of a block signal system.

**Rockford & Interurban Traction Company, Rockford, Ind.**—This company is relocating its tracks in the center of the street along the east end of Taylor's Park.

**Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.**—This company is constructing an extension of its line from Gypsum to Brushy, about 7½ miles. Contracts for the grading have been let to Donald Jeffery, Delmar, Iowa, and Duggan & Naylor, Omaha, Neb. Three bridges, two concrete box culverts and one 50-ft. deck girder span on concrete abutments, will be built by A. H. Neumann & Company, Des Moines. R. L. Cooper, chief engineer, has active supervision of the work.

**Winnipeg (Man.) Electric Railway.**—The Manitoba Public Utilities Commission has refused to grant a hearing on the application of the City Council to compel the Winnipeg Electric Railway to construct a temporary line on Sargent Avenue from Arlington Street to Wall Street.

**Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.**—This company is double-tracking its line from the city limits of Winnipeg to Kildonan Park, about 1½ miles.

**Cumberland & Westernport Electric Railway, Cumberland, Md.**—It is reported that this company will reconstruct its line between Moscow and Barton, having obtained right-of-way which will shorten the distance between the two points.

**Bay State Street Railway, Boston, Mass.**—The Public Service Commission has approved the petition of the Bay State Street Railway for permission to relocate its tracks from Wyman Street to North Federal Street, Lynn.

**Norfolk & Bristol Street Railway, Foxboro, Mass.**—This company reports that it has ordered special work for a double-track connection with the Bay State Street Railway at Norwood, Mass., to be installed during this month.

**Worcester (Mass.) Consolidated Street Railway.**—The Public Service Commission has granted the petition of the Worcester Consolidated Street Railway to relocate its tracks on Water Street between West and Main Streets.

**Kansas City (Mo.) Railways.**—This company will construct an extension of its Broadway line to Twenty-fourth Street and to the Union Station as soon as permission is received by the Kansas City Terminal Company to use the Broadway viaduct.

**Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.**—It is reported that work will be begun next spring by the Omaha, Lincoln & Beatrice Railway on the construction of an extension from Omaha to Lincoln.

**New York Municipal Railway, Brooklyn, N. Y.**—Bids will be received by the New York Municipal Railway until Oct. 16, for the installation of tunnel and station lighting equipment, etc., for the Broadway subway in Manhattan. Plans and further information may be obtained upon application to W. S. Menden, chief engineer, 85 Clinton Street, Brooklyn.

**Interborough Rapid Transit Company, New York, N. Y.**—Bids have been received by the Public Service Commission for the First District of New York for the construction of a railroad yard for the storage of subway cars in connection with the White Plains Road extension of the Interborough Rapid Transit Company. The yard is officially designated as the 239th Street yard, and will cover an area of several city blocks. Another yard is now being built at 180th Street and Bronx Park on the White Plains Road line. The 239th Street yard will make provision for 580 subway cars on 37 tracks, and an adjoining yard to be built on the same plot by the company will have a capacity for about 350 elevated cars. In order to prevent grade crossings at the entrance to the yard, the contract provides for the reconstruction of a portion of the White Plains Road structure south of the 241st Street terminal station. The Thomas J. Buckley Construction Company, New York City, was the low bidder for the construction of the yard at \$372,392.



**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—A contract has been awarded by the Cleveland, Southwestern & Columbus Railway to L. F. Gotte, Berea, at \$40,000 for grading a new branch line around Berea.

**Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.**—The Ohio Valley Traction Company, a subsidiary of the Portsmouth Street Railroad & Light Company, is constructing an extension to Ironton and will enter the city over the Sixth Street route.

**Tulsa & Oklahoma City Rapid Transit Company, Tulsa, Okla.**—S. A. Horton, attorney, 415 to 418 Baltimore Building, Oklahoma City, Okla., who is interested in the promotion of the Tulsa & Oklahoma City Rapid Transit Company, announces that construction work will be begun Oct. 20. It is said that right-of-way from Tulsa to Oklahoma City has been secured and all matters relative to bonuses arranged. The line will be about 170 miles long. [Apr. 17, '15.]

**Guelph (Ont.) Radial Railway.**—This company will reconstruct about 3000 ft. of track on Ogilvie Street, Guelph, next spring.

**Portland & Oregon City Street Railway, Portland, Ore.**—Work on the Portland & Oregon City Street Railway from Powell and East Twenty-second Streets to East Third and East Clay Streets in Portland is progressing very rapidly, and it is thought the Portland end of the railway will be completed the latter part of this month. Heavy steel rails are being laid.

**Philadelphia, Pa.**—Sealed proposals will be received by William S. Twining, director Department of City Transit, 754 Bourse Building, Philadelphia, until Nov. 2 for the construction of a section of the Broad Street subway, comprising a portion of the station under City Hall and the Market Street subway and work appurtenant thereto, known as Contract 102. This section will be about 300 ft. long and 106 ft. wide, embracing four tracks with two station platforms, and will include the underpinning of the west side of City Hall and also the Market Street subway.

**Pittsburgh (Pa.) Railways.**—The petition of the Monongahela Street Railway and the Pittsburgh Railways to the Public Service Commission for permission to tear up the double tracks on Eighth Street between Talbot and Braddock Avenues has been granted by the commission with modification. In the petition it is requested that no municipality be permitted to grant a corporation right to lay tracks on the street. The commission holds that the rights of future traffic cannot be jeopardized and that any time after ten years the company may be ordered to restore the tracks.

**Three Rivers (Que.) Traction Company.**—This company is completing the construction of an extension of its line from Three Rivers to Cap de la Madeleine, and it is expected that operation will be begun this month.

**Saskatoon (Sask.) Municipal Railway.**—About 1200 ft. of double track has been laid by the Saskatoon Municipal Railway on the new Twenty-fifth Street bridge and it is expected that the bridge will be opened for traffic by the end of October.

**Galveston (Tex.) Electric Company.**—This company is laying new rails on Winnie Street from Thirty-third to Forty-first Streets, also on Forty-first Street from Winnie Street to Broadway.

**Paris (Tex.) Transit Company.**—The City Council and the Paris Transit Company have reached an agreement whereby ornamental iron poles will be used for supports for the company's trolley wires on the public square, and the city will attach brackets and use the same poles for street lighting purposes.

**Blue Ridge Light & Power Company, Staunton, Va.**—This company has decided to make improvements and extensions in its street railway system and to add new cars and carhouse facilities and has employed W. E. Moore & Company, engineers, Pittsburgh, Pa., to supervise the construction. It is expected that these improvements will be completed by the early spring of 1917.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—A report from the Monongahela Valley Traction Company states that it expects to place contracts within the next three weeks for the construction of a ½-mile extension and

paving in Stealy Heights addition to Clarksburg and a ½-mile extension to Lumberport.

**Kanawha Traction & Electric Company, Parkersburg, W. Va.**—The Public Utilities Commission of Ohio has granted the Kanawha Traction & Electric Company permission to issue \$1,700,000 of 5 per cent bonds, \$40,000 of which is to be used in improvements in the property in Parkersburg and \$33,000 for the construction of a reinforced concrete viaduct at Boaz.

**Norfolk & Western Railway, Roanoke, Va.**—Extensive improvements, involving an expenditure of between two and three million dollars, will be made by the Norfolk & Western Railway within the next few months. Among the improvements planned is the extension of the electrification of its system on three divisions.

**West Virginia Traction & Electric Company, Wheeling, W. Va.**—Work will soon be begun by the West Virginia Traction & Electric Company laying new rails at various points along its line. New track will be laid at Fulton and Woodsdale Streets and at the curve at Echo Point.

#### SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—It is reported that this company will construct a depot at the corner of North Lemon and West Maple Streets, Orange.

**Interborough Rapid Transit Company, New York, N. Y.**—Bids will be received by George H. Pegram, chief engineer, 165 Broadway, for the completion of the passenger station electric lighting and electric heating systems for Routes 36 and 37, Borough of Queens, and the Jerome Avenue and White Plains Road lines in the Borough of the Bronx, Routes 16 and 18.

**New York Municipal Railway, Brooklyn, N. Y.**—Bids will be received by the Public Service Commission for the First District of New York until Oct. 19 for the construction of concrete track floors and platforms over the mezzanines of eleven stations on the Culver line.

**Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.**—It is reported that this company will construct a carhouse and repair shops at the junction of the Alliance and Warren divisions in Ravenna.

**Oshawa (Ont.) Railway.**—A report from the Oshawa Railway states that during the next few weeks contracts will be placed for the construction of a heating chamber and for the installation of a complete steam-heating system in the carhouse and workshops at Oshawa.

**Toronto (Ont.) Civic Railway.**—A nine-car addition is being built to the carhouse of the Toronto Civic Railway at St. Clair Avenue, Chalkley & Sons, Toronto, being the contractors.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—This company reports that it expects to place contracts within the next three weeks for the construction of a small storage barn at Gypsy, W. Va.

**Norfolk & Western Railway, Roanoke, Va.**—Among the improvements being planned by the Norfolk & Western Railway is the construction of a new freight station and additions to its shops in Roanoke.

#### POWER HOUSES AND SUBSTATIONS

**Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col.**—Extensions are being made to the plant of the Trinidad Electric Transmission, Railway & Gas Company, including the installation of a 5000-kw. turbine. Haller & Krumbhaar, 68 William Street, New York, consulting engineers.

**Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.**—This company will construct a substation at Brushy, Iowa.

**Morris County Traction Company, Morristown, N. J.**—A report from the Morris County Traction Company states that a new substation is being built at Dover, N. J. The company has just received a 500-kw. rotary converter outfit from the General Electric Company.

**International Railway, Buffalo, N. Y.**—Plans are being made by the International Railway to construct a substation at Twenty-fourth Street and Allen Avenue, Niagara Falls.



## Manufactures and Supplies

### TENDENCY STRONG FOR MOTOR-SIZE STANDARDIZATION

**Myles B. Lambert Urges Adoption of a Few Standard Motors—Operating Officials Aid Motor Development—Circuit Breakers vs. Fuses on Cars**

Standardization of railway motors is nearer than ever before, and railway men and motor designers are showing a stronger and stronger tendency toward this goal. These statements and those that are reported in the following interview were recently made by Myles B. Lambert, of the Westinghouse Electric & Manufacturing Company, to a representative of this paper.

Mr. Lambert said that the need for motor standardization is recognized on the score of service efficiency and economy.

Until recently, however, the electric roads as a class have not seemed to have a full understanding of just what the standardization of their motors would mean. There are now, including foreign and locomotive motors, approximately seventy-five types and sizes which the manufacturers are called upon to build. This is a greater variety than is necessary. All service requirements could be met by six types, within the range of 25 to 100 hp. Notwithstanding the multiplicity of designs and sizes available, the manufacturers are regularly confronted with demands for detail changes in motors that have excellent road records and for the inclusion in the design of what might be characterized as fads. The interpole railway motor has been on the market about ten years, and it is significant that during this time there have been only one or two motor designs that may be said to have remained standard for a reasonable length of time.

In earlier days the Westinghouse 101-B and the General Electric 80 motors were accepted very largely as standard motors. After their acceptance the engineering departments of the manufacturers, not being required to continue the redesign of these motors, could afford to devote a proportionately greater amount of engineering study and refinement to the two types mentioned. This benefited the purchaser as well as the manufacturer. One of the developments of this particular work was the spring cushioning of field coils. Purchasers of railway motors call for so many capacities, presumably to meet various local conditions, that the manufacturer cannot devote the same amount of engineering study toward the final refinement of any one type of motor as would be given to development work if there were fewer sizes of motors to be manufactured. For these reasons, as well as for reasons of economy in manufacture and sale, it is urged that the roads adopt a smaller number of types of motors within a given range of horsepower.

Undoubtedly a great deal of the credit for the development of the railway motor to its present high state is due to the co-operation rendered by railway officials. For service data and for authoritative opinions on the value of changes in design, the manufacturers put great reliance on the observations of the operating engineers. For that reason, as well as for the good of the industry, the manufacturers are desirous that the roads maintain the personnel of their mechanical staffs at the highest possible point. Operating men of high mechanical ability probably do as much to develop the technical side of railroading as the men in all other departments of a road. Only by the co-operation between the manufacturers and the mechanical officials has it been possible for the electric railway motor to reach its present highly developed state, and to be able to render the remarkable service that is reported for the newer types of equipment.

Reverting to standard motors, it is quite clear that if there were fewer types to be manufactured more time could be devoted by both the manufacturer's development department and by the operating officials to the improve-

ment of details of each standard motor based on service tests. It is true that with such a great multiplicity of motor designs, all of which stand up very well for a number of years, no great amount of time is available for thoroughly studying each principle and for improving any one type, because at the end of the normal life of a motor a new type is called for.

The motor of to-day for any given rating is called upon to do its work under more severe operating conditions than ever before. Cars accelerate faster because there is less voltage drop in the distribution system. Consider, for instance, the power distribution networks of to-day as compared with those of ten or fifteen years ago. Now, the trolley wire in the large cities is supplemented by an enormous amount of copper, fed from rotaries of great capacity. The track rails are welded or heavily bonded and even supplemented with continuous return copper. Thus the drop in the voltage due to the load, even though the load may be caused by a blockade, is relatively small, and the motor of a given capacity operating on a city system thus equipped performs a proportionately higher duty than the same motor in earlier days or than it does even to-day on smaller roads with their lighter distribution circuits. Higher mechanical strains and electrical stresses also must be met.

These conditions and the general appreciation of a motor built to require little maintenance expense have brought into quite general favor the solid-frame, box-type motor. In heavy city service the split-frame motor will not make the same record for low maintenance cost as the box-type motor. The split frame, where subjected to the stresses of heavy service, is less rigid and in consequence demands earlier attention for maintenance of such parts as loose housings and bearings, worn-out brush-holders, loose bolts, etc.

Standard multiple-unit control equipment is fairly well established. New types were recently developed to accommodate all types of cars, including the low-floor design. The multiple-unit type is rapidly becoming popular for city service, even where single cars are used. Among the large companies using this type are the Boston Elevated (surface lines), New York Railways, Third Avenue Railway, Brooklyn Rapid Transit, Public Service Railway, Toledo Railway, Mahoning & Shenango Valley Railway, Scranton Railways, United Railways of Baltimore, Pittsburgh Railways, United Railroads of San Francisco, and many other smaller properties.

There is, however, a great opportunity for economy in standardizing methods of installation and car wiring. The average car builder and railway operating engineers are in doubt as to how much to charge or estimate for installation of equipment. A car builder, in order to be safe in his estimate, must add a contingent allowance, because hardly any orders of control are installed in accordance with the plans followed on any previous job.

There is an opportunity here for the equipment committee of the American Electric Railway Engineering Association to establish standard methods of installation showing desired clearances, sizes and arrangement of conduit and car wiring, which are now lacking, and which the control manufacturers and car builders would all understand and work toward.

Speaking of circuit-breakers, Mr. Lambert said that the car circuit-breaker has become merely a canopy switch on those large city systems which have enormously heavy feeder and return circuits. When there is a short in the motor an enormous amperage is drawn from the heavily fed line, and it is almost without the possibility of commercial manufacture to build circuit-breakers that will safely and repeatedly handle such disturbances, particularly so since the circuit-breaker is mounted in the vestibule. Several years ago Mr. Olds, then superintendent of equipment for the Milwaukee Electric Railway & Light Company, fused each motor and urged the more general adoption of his practice. Mr. Lambert thinks that this safety method will later become general practice, namely, the use of a fuse on every motor in addition to a circuit-breaker or a high-capacity limit switch.

Because of the abnormal conditions existing in the raw materials field, engineers have found it necessary to substitute certain equipment parts so that available materials



could be used in place of those on which the supply is extremely restricted. For example, the asbestos market is glutted, and it is practically out of the question to secure the necessary quantity of asbestos heretofore used in railway equipment construction. Therefore, the manufacturers have employed treated cloth wherever possible. During the summer it was almost impossible to obtain tin, and the Westinghouse development department perfected a very high-grade lead base alloy. This bearing metal has demonstrated itself, it is said, to be the equal of the tin base alloy, and it may be adopted generally later, a plan which would reduce maintenance cost.

The Westinghouse Electric & Mfg. Company's plant at East Pittsburgh is busier than ever before. There are now more than 29,000 people on its payroll, which amounts to nearly \$2,000,000 a month. A very small part of this organization is employed in munitions manufacture. That work has practically all been removed from the East Pittsburgh plant of the Electric Company to other buildings especially devoted to munitions manufacture. Prices on railway equipment and supplies now seem to be at a maximum, and there has been no basic increase since the 1st of August. Deliveries on railway motors are quoted at from six to eight months, based on copper delivery.

### ROLLING STOCK

Levis County Railway, Levis, Quebec, is constructing two 32-ft. single-truck cars in its own shops.

Louisville (Ky.) Railway is contemplating the purchase of three trail, baggage and freight cars, 40 ft. over-all.

Blue Ridge Light & Power Company, Staunton, Va., is contemplating the purchase of six light-weight one-man cars.

Montgomery Light & Traction Company, Montgomery, Ala., has purchased five 21 E trucks from The J. G. Brill Company.

Grand Rapids (Mich.) Railway will purchase about Feb. 1, 1917, fifteen single-truck, double-entrance, pay-as-you-enter motor cars about 45 ft. over-all.

United Railways & Electric Company, Baltimore, Md., has issued invitations for tenders covering the furnishing of seventy-five double-truck, semi-convertible, four-motor, pay-within cars, together with all appurtenances. Bids are to be submitted not later than noon, Oct. 16.

Corning & Painted Post Street Railway, Corning, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 12 as having ordered four cars from the Southern Car Company, has received this equipment. These cars are arranged for double end operation either as one or two-man cars and are mounted on Philadelphia Holding Company's radial axle trucks with 11 ft. 6 in. wheelbase and are equipped with G E 258-B motors.

### TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received from the Connecticut Company a large order for overhead material, consisting of trolley frogs, trolley ears, crossovers and section insulators.

Western Electric Company, New York, N. Y., announces the removal of its offices and show rooms in Buffalo from 98 Terrace to 709-711 Main Street, where two large show windows afford splendid display facilities. J. W. Tabb is the manager.

Charles Lounsbury has been elected president and general manager of the American Railway Supply Company to take the place of the late Walter Chur, who died on Aug. 29. Mr. Lounsbury has been with this company for thirty years and was formerly assistant to Mr. Chur.

Robert C. Clifford, who for the past four years has been district sales manager of the U. S. Cast Iron Pipe & Foundry Company, in charge of their St. Louis and Kansas City offices, is now associated with the Walter A. Zelnicker Supply Company, St. Louis, Mo., in charge of its rail department.

McKeen Motor Car Company, Omaha, Neb., is shipping a 55-ft. 200-hp. composite McKeen motor-car to the Lakeside & Marblehead Railroad. The car makes the trip under its

own power in charge of a demonstrator from the works. It is to operate on the 8-mile line between Danbury and Marblehead in Ohio.

G. L. Simonds & Company, Chicago, Ill., announce a change in name. In the future the company will be known as the Vulcan Fuel Economy Company. The personnel and policies of the organization remain the same. The only change, in addition to that of the name, is an increase in capital, the better to handle the company's growing business.

Holden & White, Chicago, Ill., have been appointed general sales distributors by the Safety Appliance Company of Chicago, manufacturers of locomotive and electric railway car sanders and sanding devices. This will mean the introduction to the electric railway field of the Reliance air sander, which provides for positive delivery of sand to the rails.

Edgewater Steel Company, Pittsburgh, Pa., which was recently incorporated, has completed the details of organization and has purchased the plant of the Kennedy-Stroh Corporation at Oakmont, Pa. In addition to carrying on the lines of manufacture in steel and brass formerly handled at this plant, new construction is now under way to give this company a well-equipped plant for the manufacture of locomotive and car-wheel tires, rolled-steel wheels, gear rims, roll shells and turbine rings.

Lindsley Brothers Company has removed its general sales offices from Minneapolis to 832-34 Edison Building, 72 West Adams Street, Chicago, Ill. District sales offices will be continued both in Minneapolis and St. Louis. Headquarters will continue at Spokane, Wash., as in the past. To further improve its service to pole users the general sales offices in Chicago have been divided so that an expert will be in charge of each line of the business. G. L. Lindsley will be available at all times for consulting service, R. L. Bayne, for many years in charge of the service department, will devote his entire time to seeing that all requirements are properly taken care of, and H. S. Sines will devote his time to assisting customers in selecting the proper materials.

The Ackley Companies, represented by G. S. Ackley & Company, 50 Church Street, New York, N. Y., report a very satisfactory increase in export orders for material handled exclusively through the New York company and through various agencies. Among orders recently received for Ackley adjustable and No-staff brakes are a number from South Africa, Japan, Australia, New Zealand, Cuba, Russia, England, Chile, Brazil and Argentina. Many orders for Tool Steel gears and pinions have been received for use in mine tram cars and other industrial plants for Norway, Sweden, Holland, Russia, France, Italy, Greece, South Africa, Australia, New Zealand and Cuba. Orders for Wasson air-retrieving trolley bases have been received from Peru and Australia. They also report a very satisfactory domestic business on the Automatic trolley guard and on renewable fuses.

### ADVERTISING LITERATURE

American Steel & Wire Company, Chicago, Ill., has issued a manual of its process of water purification with sulphate of iron.

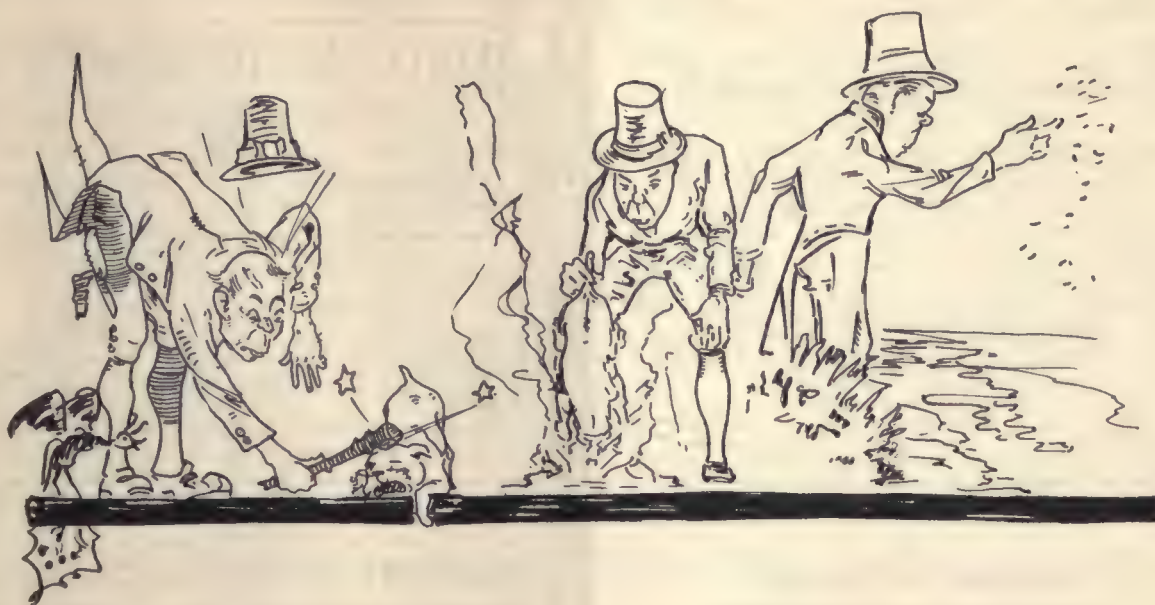
Universal Safety Tread Company, Boston, Mass., has issued an illustrated circular on Universal safety tread for school work.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued the bulletin No. 207, giving a partial list of the material it has on hand.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued an illustrated circular, printed in two colors, describing the Drew protective and reclaiming pole sleeve.

Dearborn Chemical Company, Chicago, Ill., has just issued a booklet entitled "Incrustation, Corrosion, Foaming and Other Effects of Water Used in Steam Making and Methods of Prevention." The booklet is divided into three chapters, chapter 1 describing corrosion and its causes; chapter 2, incrustation; and chapter 3, foaming. A detailed description of the service rendered by this company is also given.





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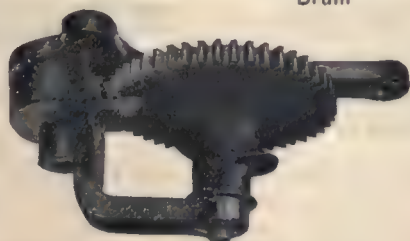
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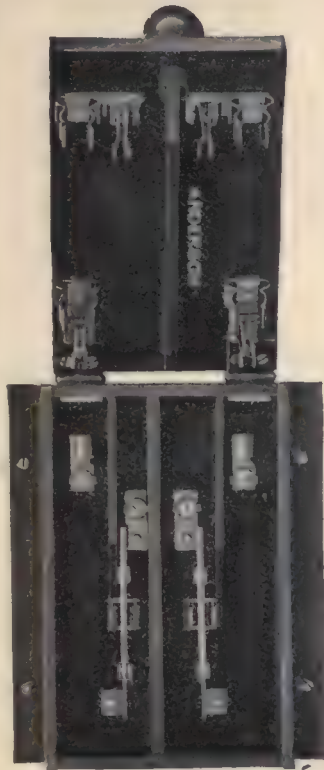
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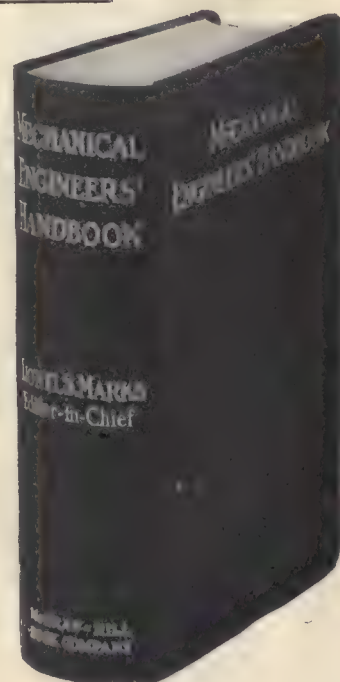
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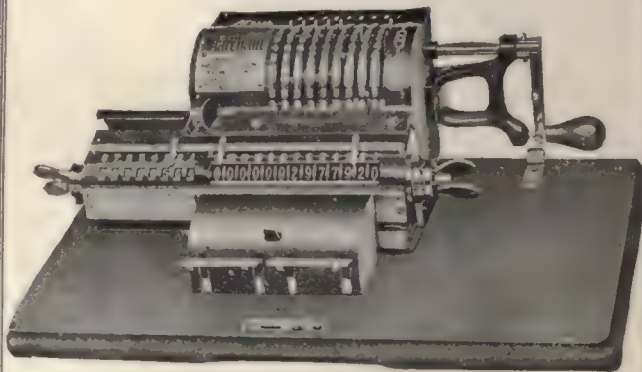
It can do away with the detail part of mathematics.

It not only performs each operation quickly, but accurately.

It is easy to operate.

It is a time saver and a labor saver, and therefore, a money saver.

These are our claims and we can prove them, but we want you to prove them for yourself. We offer you this opportunity in a 30 days' free trial. What could be fairer?



Use the Coupon

**Marchant Calculating Machine Co.**  
Oakland, California. Dept. E. 5

Gentlemen:

Without any obligation, send me information about your machine and free trial offer.

Name .....

Address .....

Business .....



## TROLLEY WIRE

### Round Grooved and Figure 8

If you will agree that one make of trolley wire is able to give longer service than another make—

That one is more economical than another—

Then investigate our trolley wire with a view to cutting your wire costs.



## Weatherproof Wires and Cables

### Star Brand

Star Brand Wires are made with long service as the most prominent feature.

Because of their ability to render long service they cut wire costs.

Read the words in the cut of the star.

# American Electrical Works

NEW YORK: 165 Broadway  
CHICAGO: 112 West Adams Street  
BOSTON: 176 Federal Street

Phillipsdale, R. I.

CINCINNATI: Traction Building  
SAN FRANCISCO: 612 Howard Street  
SEATTLE: 1002 First Avenue South

£105



## The STANDARD for RUBBER INSULATION

Railway Feed Wires insulated with OKONITE are unequalled for flexibility, durability, and efficiency, and are in use by the leading Electric Street Railway Companies. OKONITE is preferred above any other insulation for Car Wiring, Telegraph and Telephone Purposes.

OKONITE WIRES—OKONITE TAPE—  
MANSON TAPE—CANDEE WEATHER-  
PROOF WIRES—CANDEE PATENTED  
POTHEADS.

*Samples and Estimates on Application*

**THE OKONITE COMPANY,**

**253 Broadway, New York**

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Philadelphia, Pa.

Pettingell-Andrews Co., Boston, Mass.



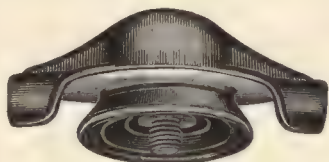
*Established 1858*

Superior  
Switches  
Mates  
and  
Frogs

Turnouts  
Crossings  
and  
Kerwin  
Portable  
Crossovers

Accessories  
of Every  
Description

Solid  
Manganese  
Steel and  
Insert Work

*Write for Catalogue**Estimates Promptly Furnished*

**You Can Minimize Overhead Repair Work**  
and successfully cut maintenance costs if you turn to

## The Macallen Line

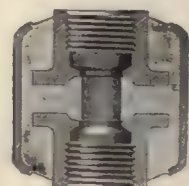
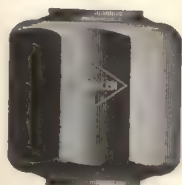
of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

## The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.



May We Send Our Catalog ?



**The Macallen Company**  
Macallen and Foundry Sts., Boston







To Overcome Poor Commutation Use

## DIXON'S GRAPHITE BRUSHES

Being non-abrasive and self-lubricating, they will not scratch or score commutators, but produce a smooth, dark surface that lessens friction and stops sparking and chattering.

To specify Dixon's Graphite Brushes means lowering up-keep and operating costs.

Write our Electrical Service Department for booklet No. 108-T and tell us about your problem.

Made in JERSEY CITY, N. J., by the

**Joseph Dixon Crucible Company**

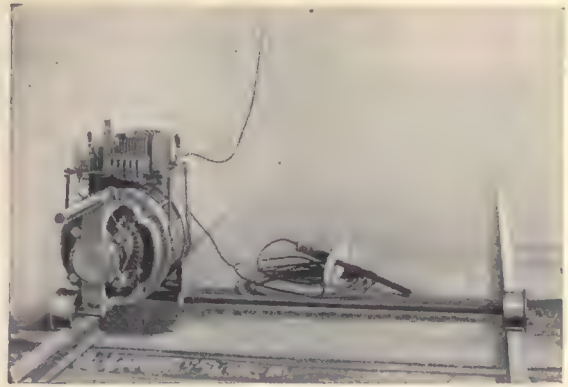
Makers of Dixon's Graphite Lubricants for Gears, Transmissions and all moving parts.



Established 1827



M-26



Lincoln Arc Welding Bonding Machine

## No Drilling, No Grinding AND 30 Bonds per Hour

No special preparation of the contact surface on the rail is necessary—the electric arc itself throws off the scale, rust or dirt, and prepares a clean welding surface. This is only one of the many features which make

## The Lincoln Rail Bonding Process

superior in simplicity and economy of operation and permanency of installation. With this system, thirty bonds per hour is ordinary performance—as a matter of fact, the actual welding requires less than forty seconds, after the bond is placed on the rail. One man, with a helper to make ready, can install Lincoln Bonds all day, on 60-ft. rail, at the rate of 30 per hour.

*And*—Lincoln Bonds, installed, cost from 20 to 50 cents *less* per bond than any others on the market. Yes, we're ready to prove it—ask us.

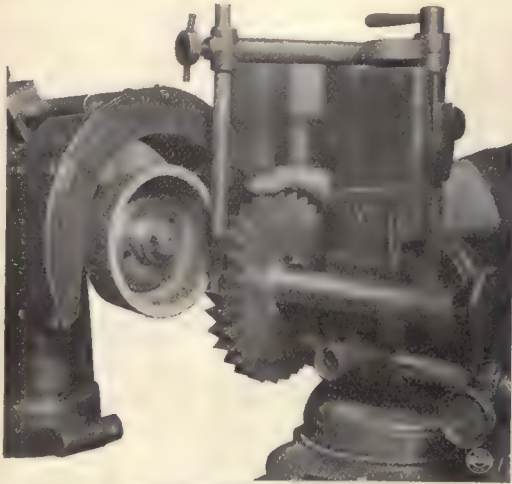
**The Lincoln Bonding Co.**

636 Huron Rd.

CLEVELAND, OHIO

Agents: Lewis & Roth Company, 312 Denekla Bldg., Philadelphia, Pa.; Charles N. Wood Company, 79 Milk St., Boston, Mass.





Set-up for Grinding Side Mill

## Alundum in the Tool Room

One of the most popular wheels for grinding gear cutters is Alundum 3846 K, although 3850 J is a strong contender for first place. In the smaller wheels 3860 K is very satisfactory.

The wheel most commonly furnished for grinding inserted tooth milling cutters is 3846 grades J and K. Under certain conditions it has been found necessary to use a little coarser wheel, 3836 and a grade as soft as I.

Form cutters are usually ground with a saucer or dish wheel and the grain and grade in greatest demand is Alundum 3860, J and K.

It is a common fault to use a wheel that is too fine. For most classes of cutter grinding a medium coarse wheel about grain 46, never finer than 60, is best suited for both high speed and carbon steel. The finer wheels are more likely to burn the work than the coarser.

## NORTON COMPANY

Worcester, Mass.

### Electric Furnace Plants:

New York      Niagara Falls, N. Y.      Chicago  
151 Chambers St.      Chippawa, Ont., Can.      11 N. Jefferson St.  
836



Set-up for Spiral Milling Cutter



## FACTS!

## Not mere arguments

have always been the big selling talk for

## Ford Tribloc CHAIN HOIST

### Steel Working Parts Instead of Iron

Ford was first to use them, a fact which immediately distinguished the Tribloc from all other makes of hoists.

### The Patented Loop Hand Chain Guide

A big safety feature—it protects the working parts and prevents gagging of the hand chain, no matter at what speed or angle you may wish to operate the Tribloc. Another fact which helped to establish the superiority of the Tribloc.

### A Five-Year Guarantee

Not just the usual one-year guarantee "against imperfections in workmanship and materials." We give the purchaser a guarantee that really protects, a fact which proves our own confidence in the Tribloc and the claims we make for it.



Our Catalogue is full of facts showing the superiority of the Tribloc. Why not write for a copy, now?

*Ford*  
of Philadelphia

## FORD CHAIN BLOCK & MANUFACTURING COMPANY

140 Oxford Street, PHILADELPHIA, PA.



**Telescopic Ram  
Hydraulic Motor Lift  
10,000 lbs. Capacity**



## LABOR SAVING HYDRAULIC TOOLS

This type of motor lift is used where sub-pits are undesirable. With the ram down, it is only 32 in. high, yet has a ram movement of 37 in. It is mounted on flat wheels so that it can be moved about the floor. The truck, rams and cylinders are steel; the pump, valves and pump pistons are bronze, and the valve seats steel.

Below is illustrated one of our types of portable crank pin presses. It is powerful and durable and is built for severe service. We build

crank pin presses in sizes ranging from 60 to 300 tons, with single or double plunger hand pumps, or motor driven pumps as desired. Write for catalog No. 84, descriptive of these and many other hydraulic machines for railway service—jacks, pit jacks, benders, shears, punches, rail benders, etc.



**The Watson-Stillman Co.,** 46 Church Street  
NEW YORK

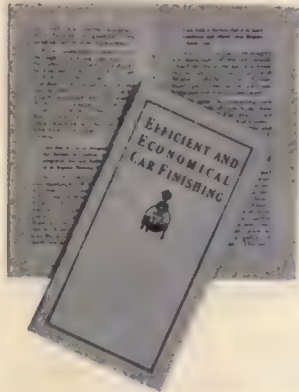
Chicago, McCormick Bldg.  
Pittsburgh, Brown & Zortman.  
St. Louis, Corby Supply Co.

Kansas City, Geo. T. Cook.  
Denver, L. C. Ulrich.  
Atlanta, Sterling G. Turner



345

**150 Ton Hydraulic  
Crank Pin Press**



## Tear Out and Mail This Coupon Today

**It will tell you how to obtain Efficiency and Economy in your Paint Shop**

Here is a booklet that furnishes general information regarding The Sherwin-Williams Modern Method Car Painting System. It will acquaint those interested in efficient car painting with the advantages to be derived through its use.

Modern Method Car Painting System eliminates all unnecessary labor and the use of excessive material, and brings about the best results in service, with a minimum expense for labor and material.



**THE SHERWIN-WILLIAMS CO.**

**Railway Paints and Varnishes**

782 Canal Road, Cleveland, Ohio

**THE SHERWIN-WILLIAMS CO.**

Gentlemen:

Please mail without obligation to me your book which will explain efficient and economical car finishing.

Name .....

Firm .....

Address ..... State .....



## Tape Security is Possible

Why not guard your equipment against attack? An easy and quick way to fortify is to specify any of our

### Dependable Brands

Protection where high voltage wires interlace  
requires extra defensive measures

**THE MECHANICAL RUBBER COMPANY**  
CLEVELAND

## Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy and sell, rent and lease or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have. The cost is a trifle, the results considerable.

## Get your Wants into the Searchlight



# Brakeshoe Wear Test

Pounds Applied	Pounds Removed	Pounds Worn from Shoe	Mileage	Miles per Pound Wear	Pounds Wear Per 1000 Miles
180	112.5	67.5	3,595	53.26	18.776
207	149.0	58.0	3,087	53.22	18.789
180	135.0	45.0	1,576	35.02	28.555



These results were achieved with a Monroe calculating machine in 20 seconds. Any one of your clerks can do it, too, with a

## Monroe Calculating Machine

The Brooklyn Rapid Transit System, the Boston Elevated Railway, the Public Service Railway, the Pacific Electric Railway and scores of others are using the Monroe for Checking storeroom invoices—following the mileage of brakeshoes, gears, car wheels or trolley wheels—

determining feeder drop versus extra copper—learning immediately the mileage, car hours and receipts of any or all divisions—preparing pay-rolls with indisputable correctness on day, week, piecework or bonus bases. In fact, for carrying out any arithmetical process in any department they find that their needs are met fully by the MONROE CALCULATING MACHINE.

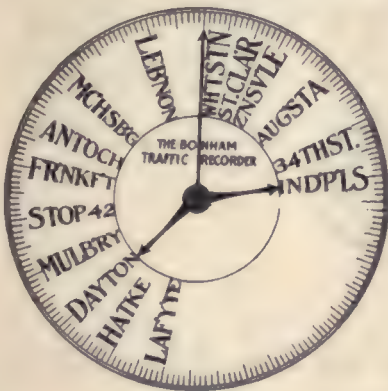
So that you may know the Monroe, we should be glad to apply it to your own work without charge or obligation.

*Write for Book of Facts and Demonstration*

## Monroe Calculating Machine Company

General Offices, Woolworth Building, New York

# Auditing Expenses are Lower



*Write for the Illustrated Book "Earnings Per Passenger Mile."*

Because the complete record afforded by the Bonham Traffic Recorder needs no compilation or checking. It is ready to be placed on your company's books.

## BONHAM Traffic Recorders

keep tab on the traffic while on the road. They do away with the need for elaborate computations. When a Public Service Commission calls on you for data as to "Earnings per Passenger Mile," YOU HAVE THE FACTS—if your cars are BONHAM-Equipped.

The Bonham Recorder not only records cash but it keeps tab on passenger-mileage—the unit needed in computing operating costs and earnings.

## THE BONHAM RECORDER CO.

Hamilton, Ohio, U. S. A.





**HEYWOOD-WAKEFIELD**

Seats are on the new Geary Street cars of the United Railways of San Francisco. Their substantial easy-operating reversing mechanism will please your men; their comfort-giving qualities and fine finish will please your public.

**Heywood Bros. & Wakefield Co.**  
 Factory, Wakefield, Mass.

New York San Francisco	Chicago Los Angeles	Richmond, Va. Portland, Ore.
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**YOU MEN  
WHO BUY EQUIPMENT  
OUGHT TO TRY**



REG. U. S. PAT. OFF.

The UPHOLSTERING and VESTIBULE CURTAIN material that "MAKES GOOD" with the user.

**PLACE A TRIAL ORDER**

Thereby doing your road a service

**DU PONT FABRIKOID COMPANY**

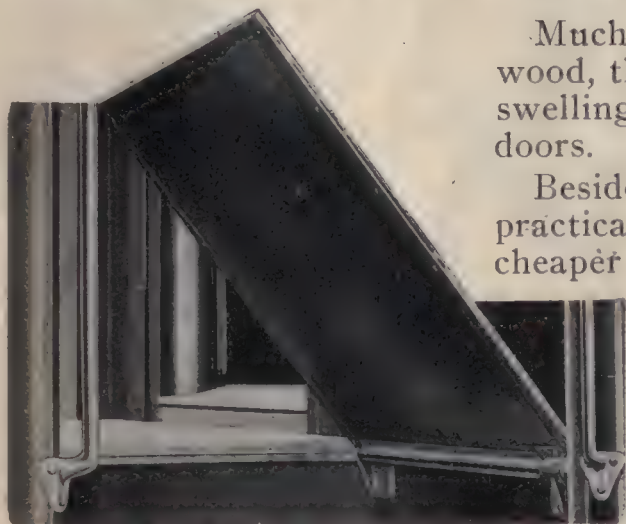
Du Pont Building,

Wilmington, Del.

WENDELL & MACDUFFIE COMPANY  
 Railway Department Representatives  
 61 BROADWAY NEW YORK



Any Interurban Car Will Be Improved  
by Installation of  
**Edwards All-Steel Trap Doors**



Much stronger and more durable than wood, they are also free from the warping, swelling and sticking nuisance of wooden doors.

Besides being noiseless in operation and practically trouble-proof, they are also cheaper when the cost of fixtures for wooden doors is considered.

Edwards Service is ready to help you improve your cars and cut your maintenance cost. Write for data regarding all Edwards Products.

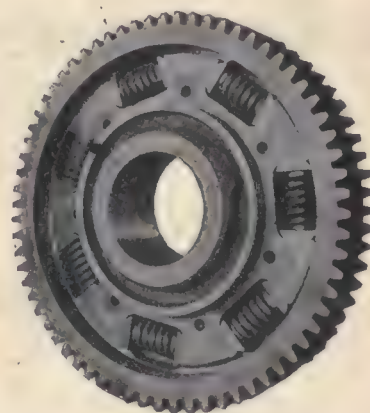
**The O. M. Edwards Co., Inc.**

Window Fixtures  
Top, Bottom and Side Weather Stripping  
Metal Stop Casings

**Syracuse, N. Y.**

Metal Extension Platform Trap Doors  
All-Metal Sash Balances and Shade Rollers  
Railway Devices

**Ninety-three Two-Motor Cars  
In P. R. R. Main Line, High  
Speed Service are equipped  
with this Flexible Gear**



It is Saving Money ten ways: Absorbing shocks due to inequalities in track, brake applications, etc., thus prolonging life of bearings, commutators, brushes, brush rigging, armature windings and insulation, truck framing and running gear. Centers are permanent, need no renewal. Rims are renewable when worn.

**NUTTALL - - PITTSBURG**





## "Lucky I Found This, Bill!"

"Just going to turn 37 over to her crew, and had Pete jump up on the front end and give her the air. Something in the brake-rigging goes 'clickety-clack, clickety-clack' every time the air goes on and off. Into the pit for me—and here's what it was. What if it had sheared off on Higgins Hill?"

There is one time—and one only—to safeguard **every** pivot-point—on the brake-rigging of **every** one of your cars—against dangerous conditions like this. And that time is **now**—to-morrow or next week may bring you a distressing accident, at the



least, expense and delay which could be prevented by use of

## Boyerized Pins

The deep, thorough case-hardening which we give Boyerized Pins gives them immunity to dangerous wear for an average of 300,000 miles of service. Think of it! Isn't two and one-half years of safety at every pivot-point of your brake-rigging worth looking into?

Dozens and scores of **other** big progressive roads have Boyerized all their equipment—why not get in line?

**Bemis Car Truck Co., Springfield, Mass.**

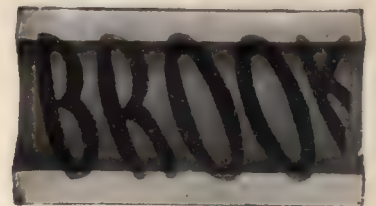
## It Costs Very Much LESS

to use a scientifically-correct and practically perfect bushing in your trolley wheels than to "rub along" with antiquated methods of oil- or grease-lubrication.

### "Bound Brook" Trolley Wheel Bushings Eliminate Trouble

—they are built to stay on the job—and that's what they do. Records of 27,000 miles and over lost their novelty long ago.

Experience has shown that the combination of high-grade, accurately-machined bronze, with its insert of fine graphite, is ideal for this exacting service. Let us show you how much less it will cost to use "Bound Brook" Bushings than to go without them.



Trade Mark Reg. U. S. Pat. Off

All genuine graphited "Oil-less Bearings" have always been made at Bound Brook, N. J., in the United States of America, by the

**Bound Brook Oil-less Bearing Co.**

Formerly Graphite Lubricating Co.



# For High Speed Operation

## —Large Diameter Kalamazoo Trolley Wheels



As a solution to arcing and short wheel life on high speed electric railway work, two new Kalamazoo Wheels have been designed.

They are (No. 20) 11½ inches and (No. 21) 10 inches in diameter. An ample increase of width, depth of groove and length of hub insures a well-balanced wheel in each case.

Tests covering considerable mileage at high speeds show that these two new "Kalamazoo's" greatly decrease sparking, while offering longer wheel life. There is more bearing on the wire, with consequent greater contact and current carrying capacity.

The patented Kalamazoo Harps have been enlarged to carry these wheels.

Try several on your lines. Compare their service with that of smaller wheels.

*Write Today.*

## STAR BRASS WORKS

KALAMAZOO, MICHIGAN

## High Trolley Maintenance Costs Flee Before the Bayonet

A Bayonet Harp will run continuously for four or five years. Our first Base, made ten years ago, is still giving perfect service. All wearing parts are renewable at very small cost.

BAYONET EQUIPMENT COSTS NO MORE than the old antiquated equipment that delays your cars a half hour or more to change a damaged trolley wheel or pole. Accidents seldom happen with our easy system of daily inspection.

**Bayonet Anti-Friction Base has all wearing parts bushed.**

**Self-Lubricating. Non-Breakable, Poles Changed in One Minute.**



**ONLY TWENTY SECONDS AND YOUR HANDS ARE REQUIRED TO CHANGE A HARP HEAD AND WHEEL**

if you use BAYONET HARPS AND BASES. All repair work, lubricating and aligning done at the work bench, the only place it can be done right. Perfect alignment and lubrication saves wheels. Trolley axles have extra long bearings and are held more firmly than any other harp on the market. This feature with the extra large contact washers insures a true running wheel and perfect conductivity. We have the evidence that WHEELS IN BAYONET HARPS WEAR A THIRD LONGER than in other harps.

You can get the evidence in your own service by 60 DAYS' TRIAL. It costs you nothing if we don't make good.

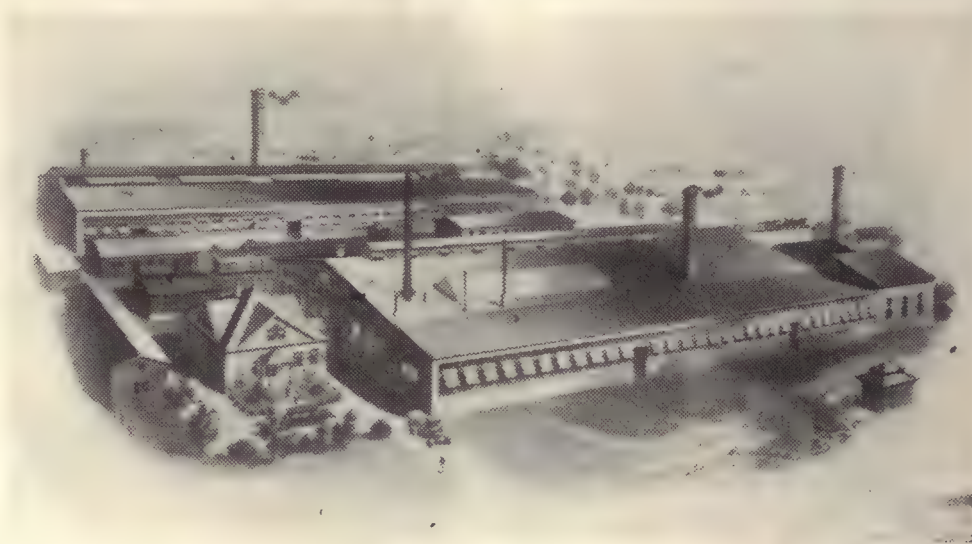
## Bayonet Trolley Harp Co.

Springfield, Ohio, U. S. A.



**100 New Cars**  
for the  
**Connecticut Company**  
to be equipped with  
**Providence Wheel Guards**  
**THE CONSOLIDATED CAR FENDER CO.**  
Providence, R. I.  
General Sales Agents  
**WENDELL & MAC DUFFIE CO.**  
61 Broadway, New York

**Makers of Carbons for Electrical Purposes for the Past Twenty-Five Years**  
**Carbon Electrodes    Motor and Generator Brushes    Battery Carbons**



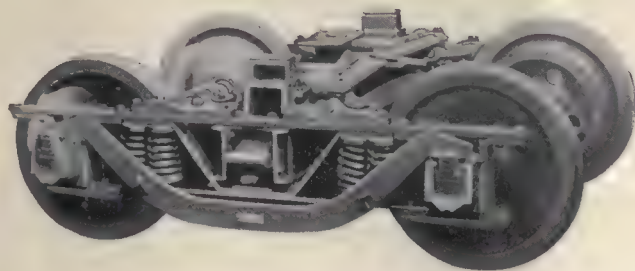
**The Plant Behind the Speer Brush**

**Speer Carbon Co.    Dept. "J".**

**St. Marys, Pa.**



# CAR BODIES AND TRUCKS



Baldwin Truck, Class 73-18-K

to secure maximum efficiency in both. Like all Baldwin trucks, this one is light in proportion to carrying capacity, and is strongly built of tested materials.

Investigate the merits of Class "K" before selecting the trucks for your new suburban cars. Further particulars will be gladly furnished on request.

should form one harmonious whole, and be designed to suit each other.

The truck builder is sometimes handicapped in this respect, as there are cases where, if a slight change were made in the construction of the body, a more efficient design of truck could be used.

The illustration shows a suburban type truck built for the Binghamton Ry. Co. Car bodies and trucks were here designed

## THE BALDWIN LOCOMOTIVE WORKS

Philadelphia, Pa.

REPRESENTED BY

F. W. Weston, 120 Broadway, New York, N. Y.

Charles Riddell, 627 Railway Exchange, Chicago, Ill.

C. H. Peterson, 1210 Boatmen's Bank Bldg., St. Louis, Mo.

George F. Jones, 407 Travelers' Building, Richmond, Va.

A. Wm. Hinger, 722 Spalding Building, Portland, Ore.

Williams, Dimond & Co., 310 Sansome St., San Francisco, Cal.

## Steel for Service



All Carnegie Wheels Are Rolled from Cylindrical Discs

The service of wheels depends on the quality of material and workmanship which enter into their manufacture.

## Carnegie Steel Wheels

are rolled from carefully selected rolled cylindrical discs.

The high grade of steel in the discs and the method of rolling from the discs produce the best wheels ever manufactured.

# Carnegie Steel Company

General Offices: Pittsburgh, Pa.





The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

**STANDARD  
STEEL WORKS CO.**  
Morris Building Philadelphia

New York	Portland
Chicago	Havana, Cuba
St. Louis	London, Eng.
Pittsburgh	Melbourne, Aust.
San Francisco	Montreux, Mex.
Richmond	Mexico City

**Standard Steel Works Co.**  
Morris Building, Philadelphia, Pa.



# Jewett

Let us furnish estimates on your standard specifications or suggest a design which we deem adaptable to your particular operating conditions.

# Cars

**The Jewett Car Co.**  
Newark, Ohio



One of a recent shipment of trailer cars to the Salt Lake & Ogden Railway Company



Standard Underground Cable Co.  
ATTENTION  
ELECTRIC WIRES, CABLES  
AND ACCESSORIES



STANDARD  
Products received  
the highest award  
granted  
Electric Wires,  
Cables and Ac-  
cessories.

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New York  
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Washington

Pittsburgh  
Cleveland  
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Detroit

Minneapolis

St. Louis  
Los Angeles  
Seattle  
Salt Lake City

San Francisco

For Canada: Standard Underground Cable Co. of Canada, Ltd.,  
Hamilton, Ont.

## STANDARD

### Wires and Cables

Bare Copper Wire  
Brass and Bronze Wire  
STANDARD C. C. C. Wire  
(Colonial Copper Clad)  
Magnet Wire  
Weatherproof Wire  
Rubber Insulated Wire  
Varnished Cambric Cable  
Fibre Lead Covered Cable  
Paper Lead Covered Cable  
Armored Cable

### Cable Accessories

Cable Terminals  
Cable Junction Boxes  
"Ozite" Insulating Compounds  
Joining Supplies  
Miscellaneous Accessories

Write our nearest office concerning  
your requirements.

**Standard Underground Cable Co.**

Pittsburgh, Pa.

## Transformers

From core to case the most efficient materials that money can buy and 25 years of specialized experience in building transformers. Any type, any size, shipped anywhere on short notice.

*Write for Bulletin E. R. J.  
It's a transformer text book.*

**The Packard Electric Co.**  
Warren, Ohio, U. S. A.

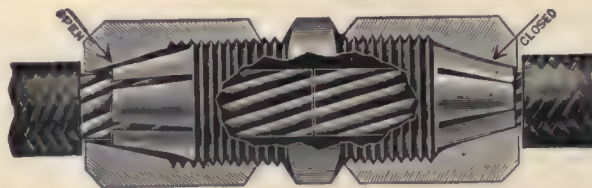


Nachod Bell on Nashville Interurban Railway

**Nachod Signal Co., Inc.**

4777 Louisville Avenue  
LOUISVILLE, KY.

# FREE



—a handbook on economical connections—and a sample Frankel Solderless Connector

MAKERS OF THE BEST ONLY  
**FRANKEL**  
CONNECTOR CO. INC. N.Y.

Factory:  
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New York  
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The man on your road responsible for economical and proper electrical connections will appreciate the story that this book and sample connector will tell.

Both represent new ideas—both point the way to better splices.

You incur no obligation in writing for them. Do it now.



# THE LINDSLEY BROTHERS CO.

## Western "Good Poles Quick" Northern

Quick Shipments  
from our  
Minneapolis Yard

Rooms 832-834, 72 West Adams St., Chicago, Ill.  
Spokane - St. Louis

Butt Treating  
Open Tank and  
"Hot and Cold" Processes

# TREATED

**POLES, CROSS ARMS, TIES,  
TIMBERS, PAVING BLOCKS.**  
CAPACITY 100,000,000 FEET B. M. PER ANNUM  
SEND FOR PAMPHLET

**INTERNATIONAL CREOSOTING & CONSTRUCTION CO.**  
Address all communications to Office, Galveston, Texas  
Works: Beaumont, Texas    Texarkana, Texas

The Celebrated

## TRENTON TROLLEY WAGON

**J. R. McCARDELL & CO.**

Patentees and  
Sole Manufacturers

TRENTON, N. J.

Correspondence Solicited

It meets every  
requirement.



*Barrett's*   
Grade One  
LIQUID  
**Creosote Oil**

CUTS WOOD  
PRESERVING BILLS  
IN HALF

Write for booklet

The *Barrett* Company  
NEW YORK  
Branches in Principal Cities

## Chapman Automatic Signals

Charles N. Wood Co., Boston



Prolong the Life of Poles—

*Reeves Wood Preserver*  
costs little - easy to apply  
Write for Sample to test



THE REEVES CO.  
New Orleans, La.



"WHALEBONE"

## Fibre Track Insulation

DIAMOND STATE FIBRE CO.

Elsmere, Del.

Bridgeport, Penna.

Chicago, Ill.

## FEDERAL SIGNAL CO.

Manufacturers } for { Automatic } { A.C. }  
Engineers } } Signaling } { or }  
Contractors } } Interlocking } { D.C. }

No Interlocking Switches Are Safe Without  
Federal Switch Guards

MAIN OFFICE and WORKS - - ALBANY, N. Y.  
52 Vanderbilt Avenue, New York    Monadnock Block, Chicago  
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## POLES WESTERN CEDAR PILING

We brag about the SERVICE we give

**B. J. CARNEY & CO.**

F. B. BRANDE, Manager    M. P. FLANNERY, Manager  
819 Broad Street, Grinnell, Ia.    Spokane, Wash.  
WM. MULLER & CO., 1729 McCormick Bldg., Chicago.  
Commit us to memory

## Kilby Frog & Switch Co.

BIRMINGHAM, ALA.

Tongue Switches, Mates, Frogs, Curves and  
Special Work of all kinds for Street Railways.

## TOOLS

for all classes of electrical construction and repair  
work. Write for catalog.

**Mathias Klein & Sons** Canal Station 25 **Chicago**

SPECIAL TRACK WORK  
For ELECTRIC RAILWAYS

## THE AMERICAN FROG AND SWITCH CO.

HAMILTON, OHIO

## Railroad and Tram Car Specialties

New inventions developed, perfected  
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**"A" Frame**  
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will bend and twist without permanent distortion. The "A" Frame shown went back to its original position after being twisted nearly 90°.

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Best steel pole in the world for electric railway trolley service, **STRONGEST, LIGHTEST, MOST ARTISTIC, LOWEST IN PRICE, QUICKEST DELIVERIES.**

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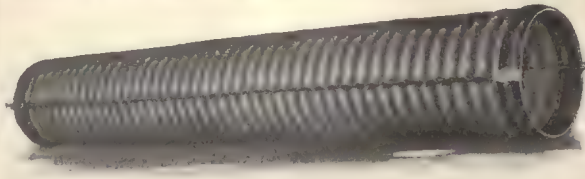
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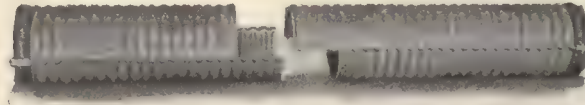
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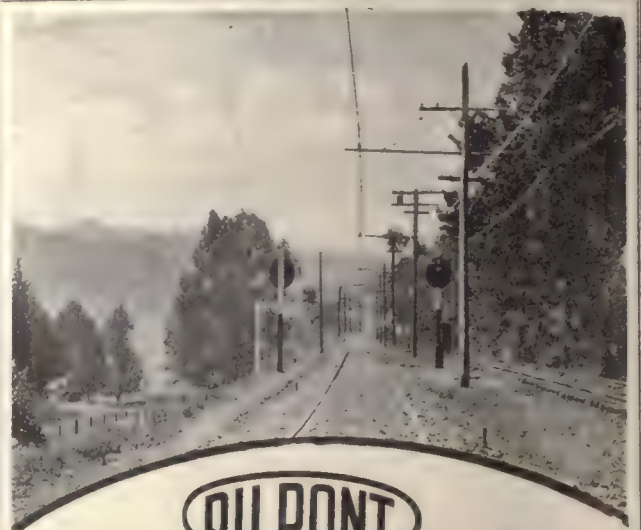


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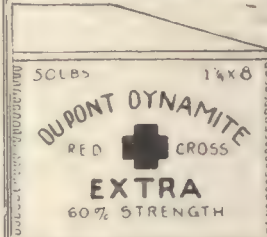
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MANUFACTURERS  
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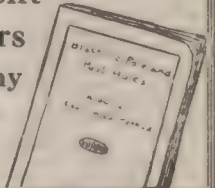
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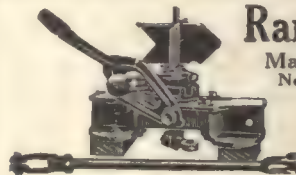


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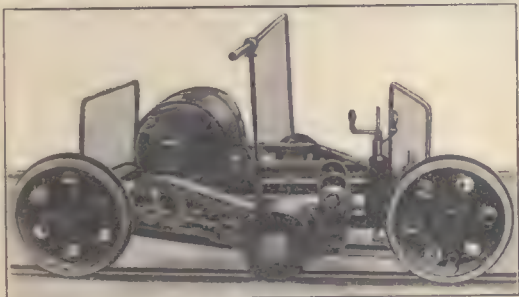


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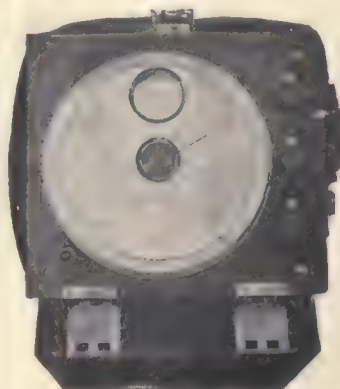


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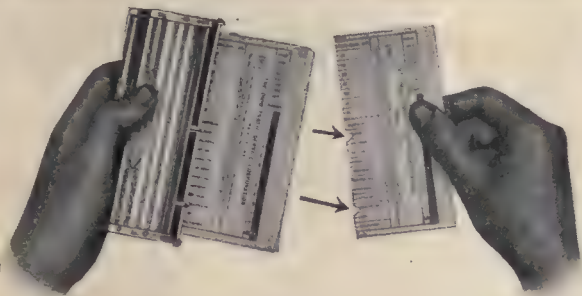
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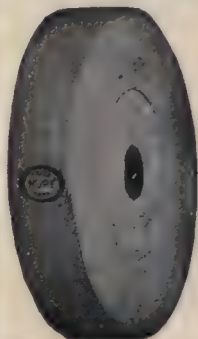


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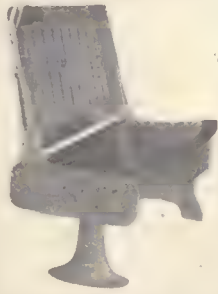
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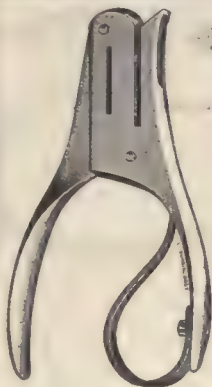
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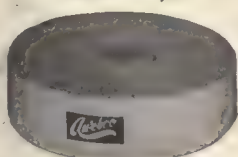
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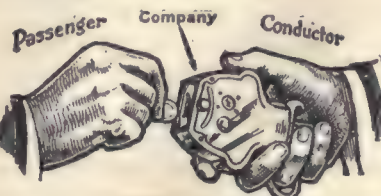
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550 VOLT DIRECT CURRENT UNIT

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Also one L. H. Wetherill Corliss Engine, 20" x 48", Band Wheel, 14' diameter, 26½" face, cast in halves.

Also one Providence Steam Engine Works, Green-Corliss Engine, R.H. Cylinder 26" x 48", wheel 21' diameter, cast in 8 segments, bolted together, rim 15" x 14".

Above equipment is in first class condition. If interested have your representative call at our works and submit us with separate price on each item after examining same.

**The Wilmington Steel Company**  
Wilmington, Delaware

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- These can be used for several different machines.

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America's Greatest Repair Works

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Commonwealth Bldg. Philadelphia, Pa.

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The advertisements in the Searchlight Section are constantly bringing together those who buy, sell, rent or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have.

The cost is a trifle, the results considerable.

*Get Your Wants into the Searchlight*

**Get Your Wants into the Searchlight**



# SEARCHLIGHT SECTION

## LEGAL NOTICES

### Legal Notice

STATEMENT OF THE OWNERSHIP, MANAGEMENT, circulation, etc., required by the Act of Congress of August 24, 1912, of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1916.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. De Mott, Treasurer of McGraw Publishing Co., Inc., who, having been duly sworn according to law, deposes and says that he is the publisher of the Electric Railway Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw Publishing Co., Inc., 239 West 39th St., New York City; Editor, H. W. Blake, Englewood, N. J.; Managing Editor, none; business manager, W. Jackson, St. Johns Place, Brooklyn, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): McGraw Publishing Company, Inc., 239 West 39th St., New York City

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

McGraw Publishing Co., Inc.

J. T. DeMott, Treas.  
Sworn to and subscribed before me this 18th day of September, 1916.

[Seal] MARTIN J. WIEMER,

Notary Public, Kings County.

Certificate filed in New York County, No. 70.  
(My commission expires March 30, 1918.)

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Positions Wanted, Evening Work Wanted, 2 cents a word, minimum charge 50 cents an insertion, payable in advance.

Positions Vacant, Salesmen Wanted, Agencies, all undisplaced Miscellaneous ads, Machinery and Plants For Sale (with oneline of display heading), 3 cents a word, minimum charge \$1.50 an insertion.

All advertisements for bids cost \$2.40 an inch. Advertisements in display type cost as follows for single insertions:

1-16 page, \$5.00	1 in. single col., \$3.00
1-8 page, 10.00	4 in. single col., 11.60
1-4 page, 20.00	8 in. single col., 22.40

In replying to advertisements, send copies of testimonials, etc., instead of originals.

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ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

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PUBLIC utility corporation requires financing. Opening for a man or banking concern with a wide knowledge of corporation matters—examinations, reports and acquisitions of traction light and power properties. Must control capital and assume active interest in the affairs of the company. Full particulars to principals only. Box 1204, Elec. Ry. Jour.

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Saves Time, Labor and Money

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# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.  
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

- Acetylene Apparatus.**  
(See Cutting Apparatus, Oxy-Acetylene.)
- Acetylene Service.**  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc.
- Advertising, Street Car.**  
Collier, Inc., Barron G.
- Air Cleaners.**  
Lord Mfg. Co.
- Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)
- Alloys, Steel and Iron.**  
Titanium Alloy Mfg. Co.
- Anchor, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
- Automobiles and Busses.**  
Brill Co., The J. G.
- Axle Straighteners.**  
Columbia M. W. & M. I. Co.
- Axles.**  
Hadfields, Ltd.  
Taylor Elect. Truck Co.
- Axles, Car Wheel.**  
Bemis Car Truck Co.  
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Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.
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American General Engrg. Co.  
Columbia M. W. & M. I. Co.
- Badges and Buttons.**  
American Railway Supply Co.  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.  
Woodman Mfg. & Supply Co., R.
- Bankers and Brokers.**  
Coal & Iron National Bank Co.  
Halsey & Co., N. W.
- Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.
- Bearings and Bearing Metals.**  
Ajax Metal Co.  
American General Engrg. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Hardy & Sons, Wm. A.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.
- Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.
- Bearings, Oilless, Graphite, Bronze and Wood.**  
Bound Brook Oil-less Bearing Co.
- Bearings, Roller and Ball.**  
Gurney Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.
- Bearings, Roller Side.**  
Holden & White.
- Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.
- Benders, Rail.**  
Niles-Bement-Pond Co.  
Watson-Stillman Co.  
Zelnicker Sup. Co., W. A.
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Du Pont De Nemours & Co., E. I.
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- Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Boilers.**  
Babcock & Wilcox Co.
- Boiler Cleaning Compounds.**  
Dearborn Chemical Co.
- Bond Clips.**  
Electric Railway Improve. Co.
- Bond Testers.**  
American Steel & Wire Co.
- Bonding Apparatus.**  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc.
- Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.
- Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.  
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- Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.
- Braces, Rail.**  
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Wheel Truing Brake Shoe Co.
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Columbia M. W. & M. I. Co.  
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National Brake Co.  
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Western Electric Co.  
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- Brush Holders.**  
Anderson Mfg. Co., A. & J. M.
- Brushes, Carbon.**  
Dixon Crucible Co., Jos.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Speer Carbon Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
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Beaumont Co., R. H.
- Bumpers, Car Seat.**  
Electric Service Supplies Co.  
Imperial Rubber Co.
- Bunkers, Coal.**  
Beaumont Co., R. H.
- Bunting.**  
Boyle & Co., Inc., John.
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Bemis Car Truck Co.
- Bushings, Fibre.**  
Diamond State Fibre Co.
- Bushings, Graphite & Wooden.**  
Bound Brook Oil-less Bearing Co.
- Bushings, Rubber.**  
Imperial Rubber Co.
- Buttons.** (See Badges and Buttons.)
- Cables.** (See Wires and Cables.)
- Carbon Brushes.** (See Brushes, Carbon.)
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- Car Panel Safety Switches.**  
Krantz Mfg. Co.
- Car Trimmings.** (For Curtains, Registers, Doors, Seats, etc. See those headings.)
- Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
United Electric Car Co., Ltd.  
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Electric Storage Battery Co.  
General Electric Co.
- Cars Stop, Automatic.**  
Consolidated Car Heating Co.
- Carts, Dump.**  
Differential Car Co.
- Castings, Brass.**  
Frankel Connector Co.  
More-Jones Brass & Metal Co.
- Castings, Composition or Copper.**  
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- Castings, Gray Iron and Steel.**  
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American Steel Foundries.  
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Hadfields, Ltd.  
Long Co., E. G.  
St. Louis Car Co.  
St. Louis Steel Foundry.  
Standard Steel Works Co.  
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Bemis Car Truck Co.  
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St. Louis Car Co.
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Eclipse Railway Supply Co.  
Electric Service Supplies Co.  
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Kerschner Co., Inc., W. R.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Union Electric Co.  
Wood Co., Chas. N.
- Ceiling, Car.** (See Headlining.)
- Chain & Belt Machinery.**  
Beaumont Co., R. H.
- Charging Sets, Storage Battery.**  
General Electric Co.
- Checks, Employees.**  
American Railway Supply Co.
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- Chemists.**  
Little, Inc., Arthur D.
- Circuit Breakers.**  
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General Electric Co.  
Western Electric Co.  
Westinghouse Ele. & M. Co.
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Frankel Connector Co.
- Clamps and Connectors for Wires and Cables.**  
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Anderson M. Co., A. & J. M.  
Electrical Engrs. Equip. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Klein & Sons, Mathias.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.
- Cleaners and Scrapers, Track.** (See also Snow Plows, Sweepers and Brooms.)  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Western Electric Co.  
Van Dorn & Dutton Co.
- Cleats, Car Wiring.**  
General Electric Co.
- Clusters and Sockets.**  
General Electric Co.
- Coal and Ash Handling.** (See Conveying and Hoisting Machinery.)
- Coil Banding and Winding Machines.**  
American Gen'l Eng'g Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
Western Electric Co.
- Coils, Armature & Field.**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D. & W. Fuse Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.
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Electric Service Supplies Co.  
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For complete information regarding Model 370, write for Bulletin No. 2003. Other models in this group are Model 341 A.C. and D.C. Portable Voltmeter, described in Bulletin 2004; Model 310 Single-Phase and Direct Current Portable Wattmeter, and Model 329 Portable Polyphase Wattmeter, both described in Bulletin No. 2002.

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*Colfax Avenue, Benton Harbor, Michigan. Brick (Pitch Filled) on old macadam base*

# Barrett's PAVING PITCH

## *Making Brick Pavements Frost-proof*

THESE two pavements in Benton Harbor are laid on an old macadam foundation. The long winter, the deep snows and the many frosts of this region make it imperative that the brick pavement with such a foundation be thoroughly protected against damage by frosts, so the joints are filled with Barrett's Paving Pitch.

Cement filler would have caused trouble by expansion and contraction. Sand filler would have let frost get easy access into the foundation. Asphalt filler lacks adhesion in cold weather and would part company with the bricks, leaving chinks through

which water and frost could get through. But Barrett's Paving Pitch keeps its grip on the bricks in all weathers and maintains eternally a flexible waterproof seal.

The old macadam foundations are kept as dry as a bone. Damage by frost is unknown. These pavements, therefore, retain their original perfect contour. There are no cracks, no expansion blow-outs, no thrusting up at the curb or against the street car rails; no damage by frost or water.

And Barrett's Paving Pitch will last as long as the pavements.

*Booklets free on request. Address our nearest office.*

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*Columbus Avenue, Benton Harbor, Michigan. Brick (Pitch Filled) on old macadam base.*



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We could, but we refrain because there is another thing that will probably please you more.

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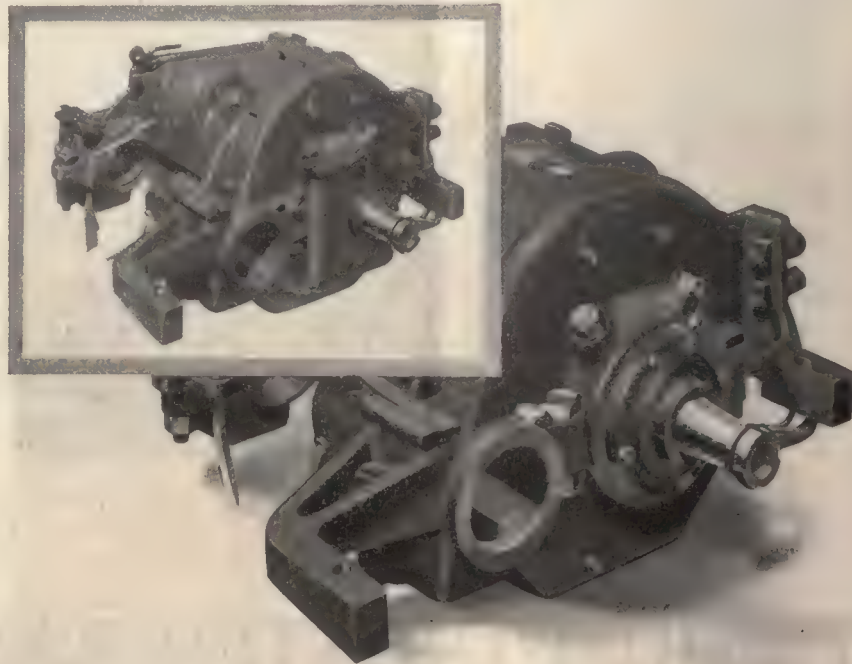
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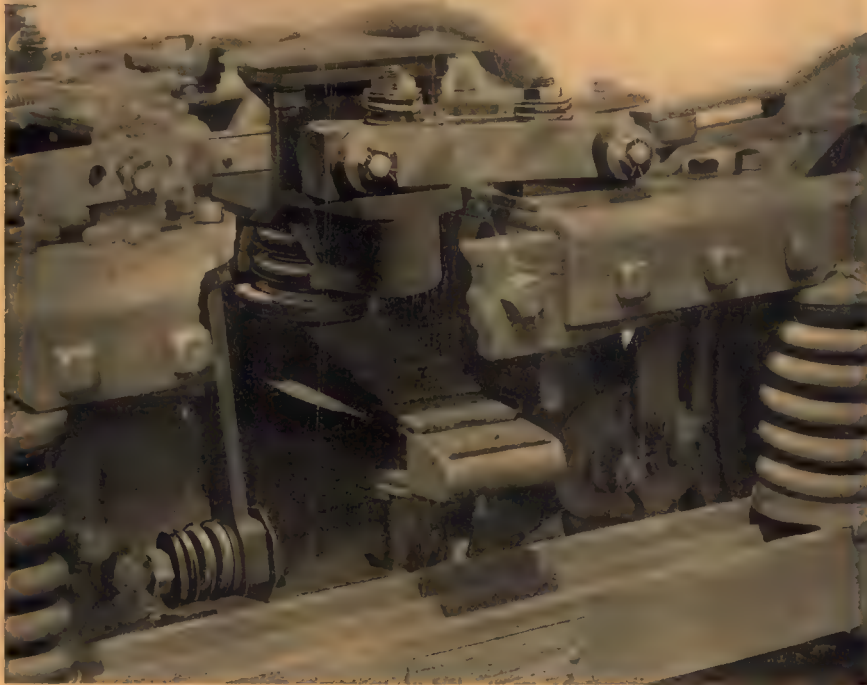
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## Improved Construction for Brill Trucks



**T**HREE very important improvements in Brill truck design recently have been installed as standard on the various Brill trucks to which they are applicable. These improvements are the Brill (patented) Graduated Spring System, the Brill (patented) Bolster Guide and the Brill (patented) Side-swing Dampener. They combine an ease and steadiness of riding on tangents, curves, during acceleration and braking to a degree that is distinctly noticeable. The

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You will also be interested to see the G-E Controllers that have so successfully handled 3,000 volts on the Chicago, Milwaukee & St. Paul.

You can get up-to-date on the control proposition by asking the representatives at the G-E Booth, No. 20.



### General Electric Company

General Office, Schenectady, N. Y.

P C Control





# ELECTRIC RAILWAY JOURNAL

First Report  
of Atlantic City  
Convention

Issue Also  
Includes Regular  
Departments

New York, October 14, 1916 McGraw Publishing Co., Inc. Vol. 48, No. 16 10c a copy

## Convention Report Issue



NEW  
ECONOMY  
METER

WITH  
CYCLOMETER  
DIAL

**ECONOMY**  
  
**METERS**

The enlarged plant of the Sangamo Electric Company, Springfield, Ill., provides greatly increased facilities for the manufacture of Sangamo Meters for Every Electrical Need





## Home From the Convention

"JOE," said the General Manager to the Superintendent, as their morning "Flier," on time to the minute, landed them at the home train shed. "It was a great convention. One of the most valuable features to the whole industry was the apparent desire of everyone for greater standardization in cars and equipment. By the way, have you that list of Westinghouse Standard Motors, you jotted down for me?"

"Yes, Boss," answered Joe, "I have it in my note book, but I can call it off with my eyes shut:—

No. 506.....	25 H.P.....	890 lbs.
No. 514.....	40 H.P.....	1700 lbs.
No. 532.....	50 H.P.....	2325 lbs.
No. 306-CV..	60 H.P.....	2700 lbs.
No. 548.....	95 H.P.....	3125 lbs.

"Good, Joe," said the General Manager, "you have a great memory. The Westinghouse people have certainly made a fine start in standardizing their product."

**Westinghouse Electric & Manufacturing Co.**

Sales Offices in All  
Large American Cities



East Pittsburgh,  
Pennsylvania



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 16

NEW YORK, OCTOBER 14, 1916

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Circulation of this issue 7250 copies





## A Specialty and its Specialists

A Manager recently remarked to his President:

"We use Westinghouse air brakes because they're the best. They're made by specialists who make nothing but air brakes and give their undivided attention to that. They have the experience of a lifetime and know the business from A to Z.

Then there's their field corps of engineers and expert inspectors—it's the best thing I ever saw—and it's free. They'll work out any braking problem for you and supply you with the brake best suited to any particular class of service. We rely on them absolutely and call them in right along. They've helped us over many a rough place and saved us thousands of dollars real money."

*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:

Westinghouse Building

CHICAGO:

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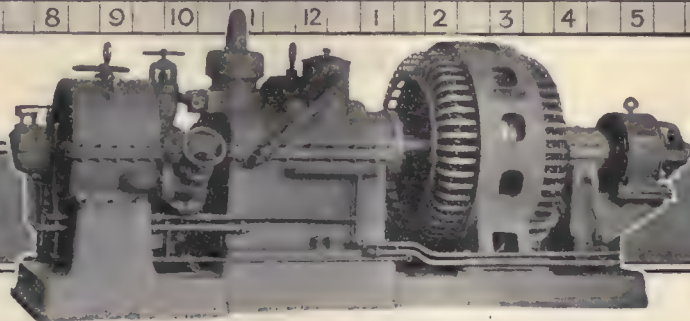
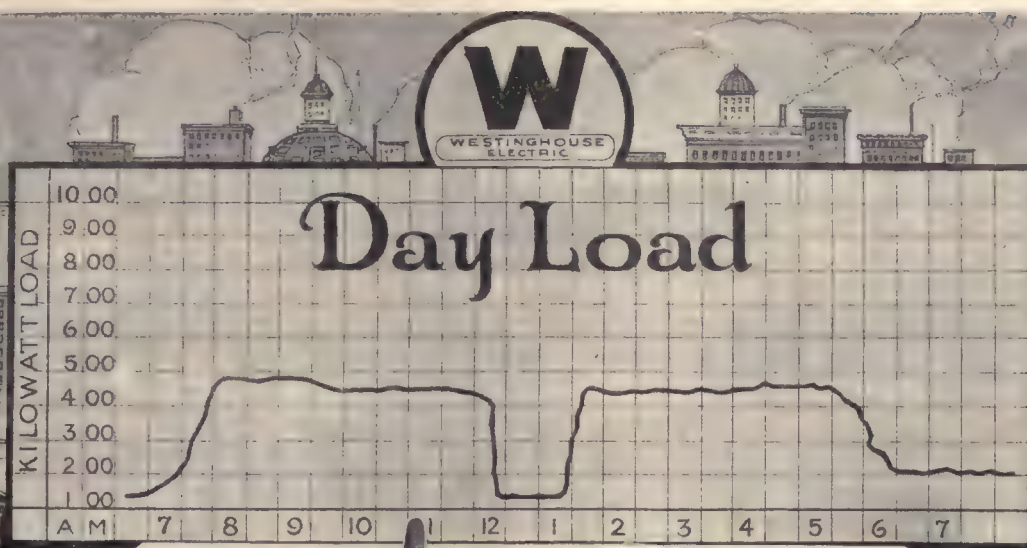
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City Investing Building

ST. LOUIS:

Boatmen's Bank Building





## The Change From Day Load To Night Load

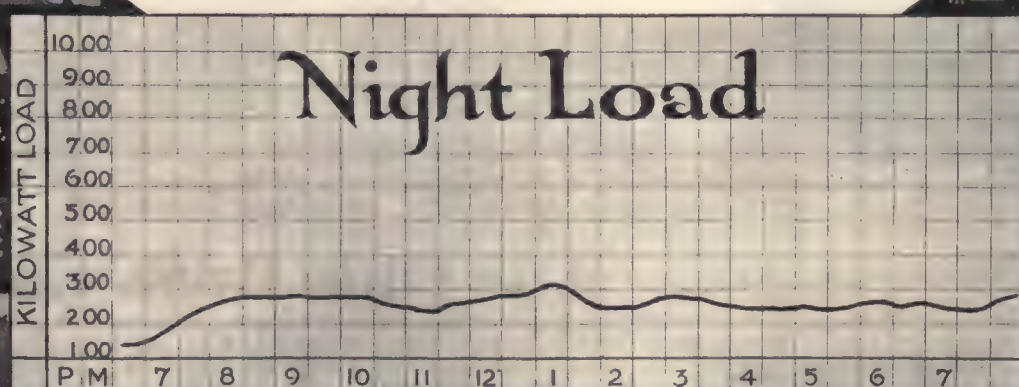
is often a change from efficient to inefficient operation because of the drop from normal to fractional loads. Sometimes a small lighting set is installed to avoid operating the main power unit at the lighter loads, with poor economy.

Why resort to these makeshifts? Why throw away money in any form?

### Two-Nozzle Design Westinghouse Geared Turbo Generators

secure fractional load economies substantially as good as those at full load. They were designed primarily for the variable-load plant. They are, therefore, ideal units for day-load-night-load operation.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh, Pa.









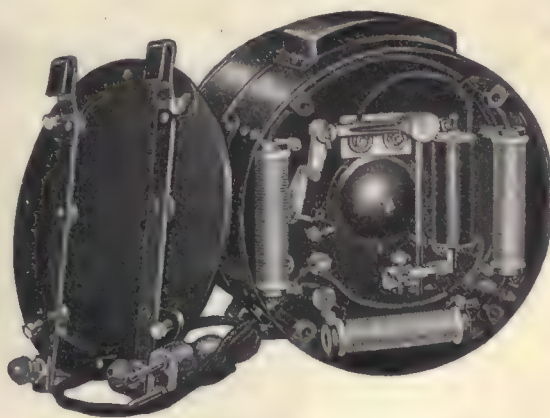


## Crouse-Hinds Imperial Luminous Arcs

Are the right headlights for a strong illumination far down the track. They are particularly fitted for high speed suburban and interurban work.



Type LAA—Luminous Arc



Type LAA—Rear door open showing operating mechanism

The Type LAA is typical of these high-powered headlights.

The case of heavy ribbed steel is divided in two compartments by a partition which also acts as a reinforcement. With this construction the mechanism in the rear is not exposed to fumes and deposits from the electrodes in front.

The casing is so protected by a special process that it will not oxidize or be attacked by the fumes given off by the electrodes.

This headlight is fitted with a semaphore lens which concentrates the light where it is needed. It is provided with incandescent lamps for use when running through the city.

The Crouse-Hinds Imperial Line includes Luminous Arc, Carbon Arc and Incandescent Headlights for all classes of service.

*For Catalogs write to*  
GENERAL SALES AGENTS

**The Ohio Brass Company**  
Mansfield, Ohio



# Phono-Electric

## —The Wire of Long Life



### 1908—?

In the Spring of 1908 the Union Railway Company, New York, put up one-half mile of No. 0000 Phono-Electric grooved trolley wire on Third Avenue between 145th and 149th Streets.

It couldn't have been put in much harder service for it was placed in a trough under an elevated railway with the clearance so scant that the wire was offset about 14 in. to permit current collection.

A sweet place for side wear!

Up to June, 1916, this one-half mile of Phono-Electric suffered six breaks—and just one of them was due to railway operation.

Well, this wire has been worn from a diameter of 0.482 in. to an average of 0.360 in. and a minimum of 0.205 in. But it's still there!

How long did the No. 00 copper wire of former days last here?

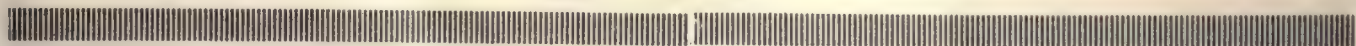
It was renewed at least twice a year and sometimes broke within a week after installation.

This difference in life of at least 16 to 1 can hardly be accounted for by the larger gage of Phono-Electric alone, can it?

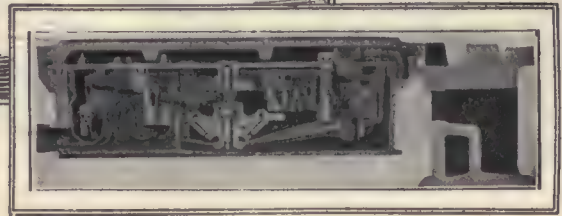
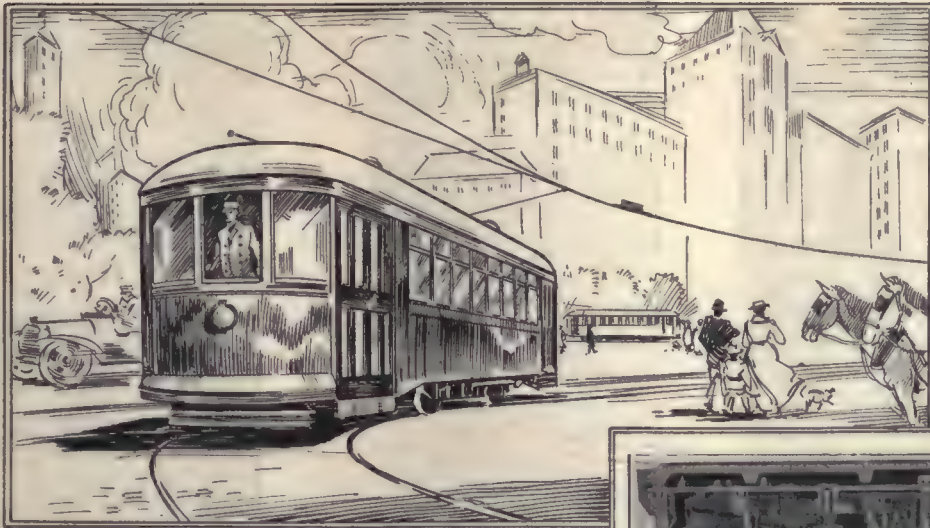
## Bridgeport Brass Company

Bridgeport

Connecticut







# Collins

## Electric Track Switches

### Think for the motorman

Everybody knows there is nothing like an electric switch for maintaining schedules. But it must be a good switch—one that is really automatic and doesn't get out of order easily.

The Collins Electric Track Switch is that kind of a switch. Firstly, because it is made right. Secondly, because its ability to stay right does not call for the motorman to do any thinking.

The motorman has enough to do to watch his track and use his head and hands to work his brakes and control apparatus. If you give him a track switch that calls for thinking on his part for proper operation, you will either be disappointed in the switch or the motorman.

We are talking about average motormen because those who are above the average don't remain motormen long—they become general managers.

**Collins Non-Splashing Electric Track Switches** think for the motorman. A car can stand directly under the contactor for an indefinite period without damaging the equipment.

Then, too, the switch cannot be thrown between the trucks of a car by a following movement under the contactor.

These features alone make the Collins worth while. There are other good reasons why the Collins is the best electric track switch on the market.

### THE HITS BUNCHED

It does not splash mud and water; the switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed and without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

## United States Electric Signal Company

West Newton, Massachusetts

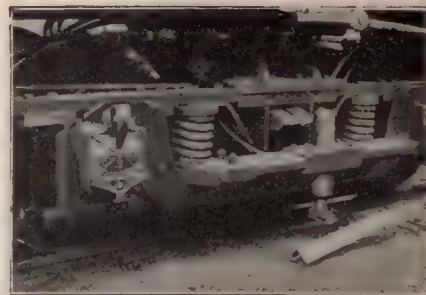
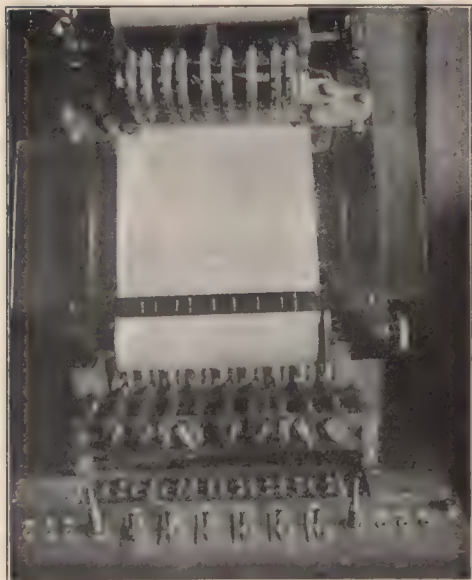
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Chicago, Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Services Supply Co., Salford, England







The  
FROM THE TRAIN

**SIMMEN  
SYSTEM  
Signals**

TO THE TRAIN

**Both  
Ways**

## *To the Train*

Signals to the train are communicated in such a way that they cannot be overlooked. They are in the cab within a short distance of the motorman's eyes, and the indication is continuous. The signals are communicated to the cab by means of a short signal rail, and a contact shoe carried on the truck of the car so that it will pass over the signal rail. Whatever indication is received on the signal rail is carried as a continuous indication until changed by another rail. Green means proceed; red means stop. With such a signal there can be no doubt in the mind of the motorman as to his running rights.

## *From the Train*

The same contact rail that automatically sets the signal in the motorman's cab also, and at the same time signals from the train to the dispatcher. This signal to the dispatcher is received in such a way that it automatically records the location of the train and the time the train reached that location. The many signals received by the dispatcher as each train passes each siding are so received that the result is a train sheet in graphic form, made automatically by the movement of the trains themselves. With such a record of train movements there can be no doubt in the mind of the dispatcher as to the exact location of every train on his division.

**SIMMEN AUTOMATIC RAILWAY SIGNAL CO.**

1575 Niagara Street, Buffalo, N. Y.

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# Time is the Essence of Railroading



The Rico Coasting Recorder  
is the only device that measures  
the time elements which control  
efficient car operation

## Railway Improvement Co.

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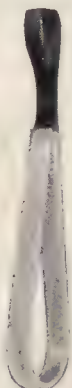




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No. 2



No. 3



No. 4



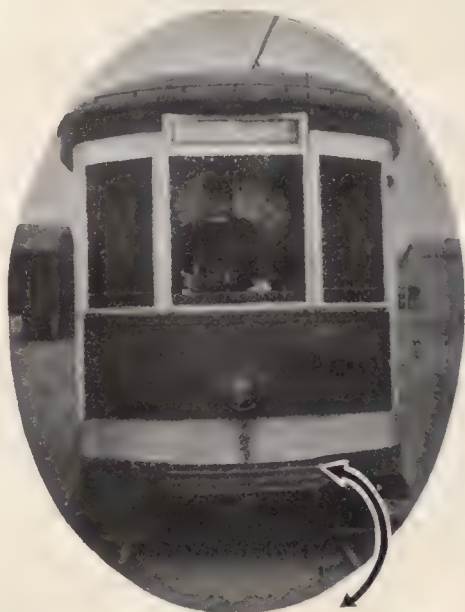
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No. 6

## Rico Sanitary Straps

Used in hundreds of thousands to promote sanitation, satisfaction and service. A style for every class of service. A small investment that produces great satisfaction.



Car Equipped with RICO Anti-Climbers

## Rico Anti-Climbers

Standard on more than half the electric railways of North America for providing protection against the effects of collisions. They are an inevitable feature of safety against the worst form of accidents.

# RAILWAY IMPROVEMENT CO.

Executive Offices, 61 Broadway, New York

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LONDON



# For Drying Sand

*More Efficiently and Better—at Half the Cost*

Use  
**Keystone  
Sand  
Driers**



Use  
**Keystone  
Sand  
Driers**

It consists simply of a cast-iron heater surrounded by a sheet-iron hopper, which rests on a perforated ring. Wet sand is shoveled into the hopper against the heater, and as it dries runs out through the perforated ring at the bottom.

It dries the sand quickly and cheaply; uses no steam coils; is made to burn any kind of fuel; may be located and operated anywhere; it is the solution for your sand-drying problems.

Let us send you our booklet and give you quotations.

**ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

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# ARISTOS

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### COPPER CLAD STEEL WIRE

First Cost Less Than Copper  
 7% Lighter (Size for Size)  
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 126% Greater Elastic Limit  
 Maintenance Cost Less Than Copper

### A Perfected Product for a National Need

The cost of copper continues to soar. The country's demand for electric service continues to grow. Extensions and replacements of equipment are imperatively needed. "COPPERWELD"—Copper Clad Steel Wire—solves the problem. Write for data showing "COPPERWELD" Wire advantages in any of the following service applications:

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Eastern Sales Office  
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Drawn and Sold Exclusively by  
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It contains the whole story of Aluminum Electrical Conductors, and explains the economy which can be effected by use of aluminum—a highly important feature in view of the high price of copper. This book will show you how to save money—and it is yours for the asking. Sign and mail the coupon *now*.

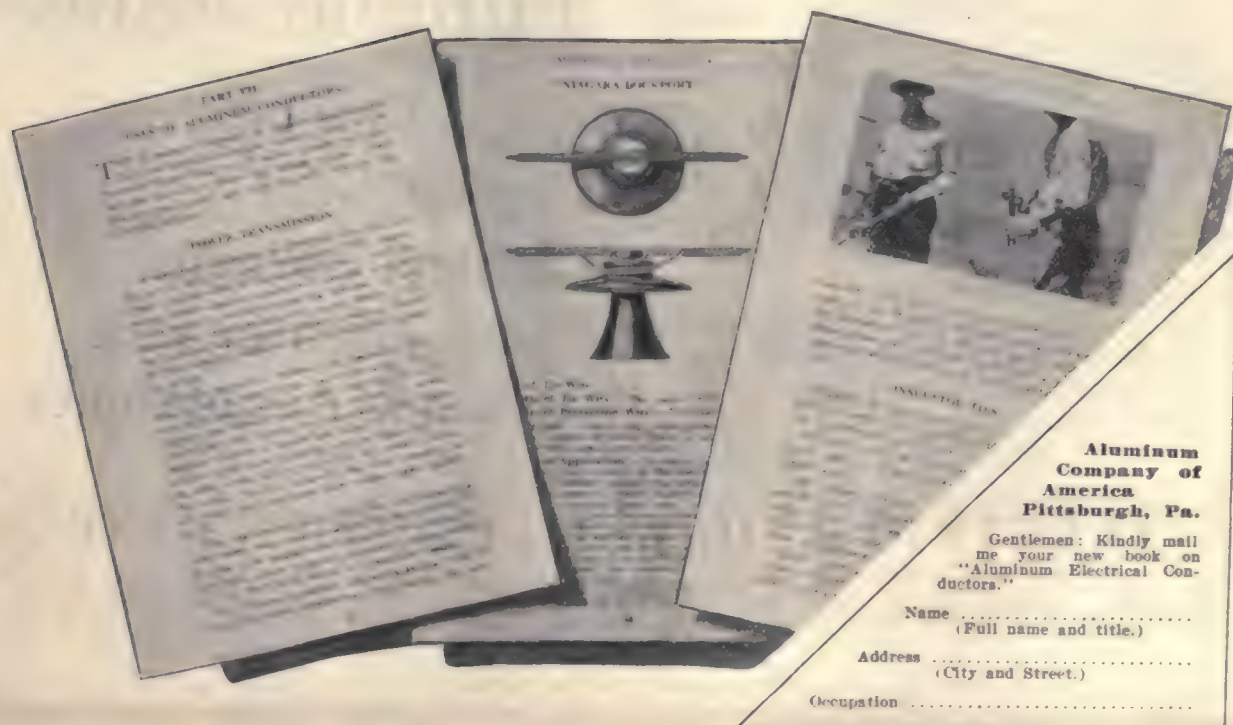
## Aluminum Company of America Pittsburgh, Pa.

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Boston

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### Aluminum Company of America Pittsburgh, Pa.

Gentlemen: Kindly mail me your new book on "Aluminum Electrical Conductors."

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Occupation .....



# The ELRECO Tubular Pole

is the most  
Adaptable for  
Joint Railway and  
Lighting Use

For many years the American Electric Railway Association, the National Electric Light Association and others have endeavored to work out a joint pole arrangement for carrying utility wires in the streets.

Such joint agreements are very desirable, not only for reasons of economy but also because towns and cities find the number of poles necessary for individual utility service objectionable.

In the Elreco Tubular Pole we have a pole that lends itself most readily to combination railway and lighting services.

Elreco Tubular Poles may be equipped with ornamental bases, lamp brackets or other fixtures designed to harmonize with the local decorative schemes.

Such ornamental and service additions can be made at any time before or after the pole is set. An example: Pittsburg, Pa., equipped 400 standard street railway poles with brackets for ornamental street lighting. This practice is becoming universal.

The versatility of the Elreco Tubular Pole is not shared by any other form of steel pole.

This fact is worth your consideration when you place your next pole order.



## ELRECO Tubular Poles

Combine  
Lowest Cost  
Lightest Weight  
Least Maintenance  
Greatest Adaptability

**ELECTRIC RAILWAY EQUIPMENT CO.**

Cincinnati, Ohio

New York, 30 Church St.



# For Satisfactory Service—

## Wasson Bases

The Wasson Air Retrieving Trolley Base prevents expensive damage to overhead caused by wild trolley poles. In case of dewirement the base forces the pole to the roof, cushions it and locks it on the roof.

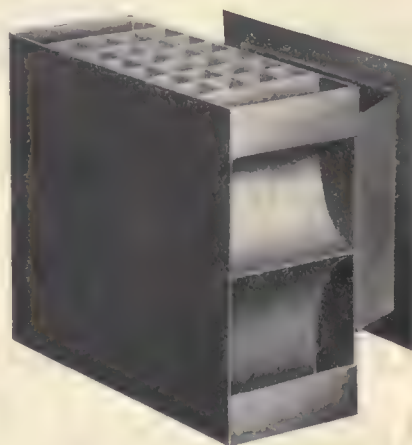
This base positively retrieves whether the pole is held by a rope or not. A sudden upward motion causes it to operate instantly. It can be placed on any car having air brakes. It offers also other superior advantages such as uniform tension on the wire regardless of height, roller bearings, better wiring through special work.



## Perry Bearings

Reduce your wheel flange wear, rail wear and power consumption by using Perry-Hartman self centering center plates and anti-friction side bearings. They prevent binding between truck and body bolsters. Over 200,000 in use.

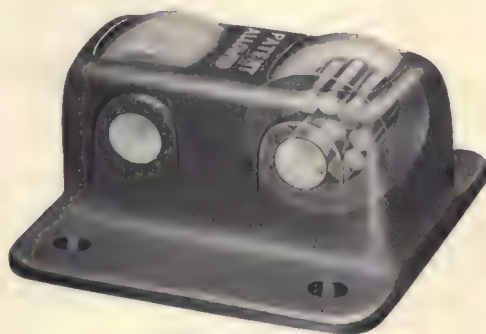
Perry-Hartman bearings require no lubrication, have nothing to wear out and do not pit raceways. The side bearings have ten small rollers on each main roller. The center plates have balls  $2\frac{1}{8}$  inches in diameter able to stand a load of 175,000 pounds each. Can be installed on almost any truck or body bolster.



## Garland Ventilators

Make your passengers comfortable in well ventilated cars. The fact that there are more Garland ventilators today on railway cars than all other ventilating devices combined indicates their superior efficiency.

They are produced in several models for various classes of service. We illustrate here a honey-comb type for monitor roof city cars. It is storm proof and will not admit side winds or rain. Service tests prove that Garland ventilators will pull the greatest amount of air from a car body—another reason for their extensive use on electric cars.



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Track Reconstruction in Cleveland—Old concrete and wooden ties left in place

Renew  
with  
International  
**Steel  
Twin  
Ties**  
For  
Permanent  
Construction

The Cleveland Railway Co. renews its old wooden tie track on Broadway Ave., with permanent construction on International Steel Ties at a big saving.

The old concrete foundation was not disturbed and the wooden ties were left in place. The shallow bed of concrete required beneath the rail with the use of the International Steel Twin Ties results in greatly simplified and economical rehabilitation of worn-out wooden tie track.

Let us furnish you with figures on economical reconstruction.

We can make immediate shipment of ties.

**The International Steel Tie Company**  
General Sales Office and Works: Cleveland, Ohio

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The above illustrated "Armco" Iron Culvert was installed under the Pennsylvania main line in 1911, and was recently inspected. Condition perfect.

## Like the Iron of One Hundred Years Ago

Why did the iron of our forefathers resist time and the elements? Why did year after year see it give good service? What were the qualities of this early iron that has come down through a century? Purity—evenness—and solidity, the same three qualities found in a yet higher degree in "Armco" (American Ingot) Iron.

# ARMCO IRON Resists Rust

Besides, the corrugated form and interlocking joints of "Armco" Iron Culverts add enormous strength and a resiliency or toughness that enable the pipe to withstand conditions of shifting and settling foundations.

*For full information and prices on "Armco" Iron Corrugated Culverts, Siphons, Flumes, Sheets, Roofing, and Formed Products, write the manufacturer in your vicinity.*

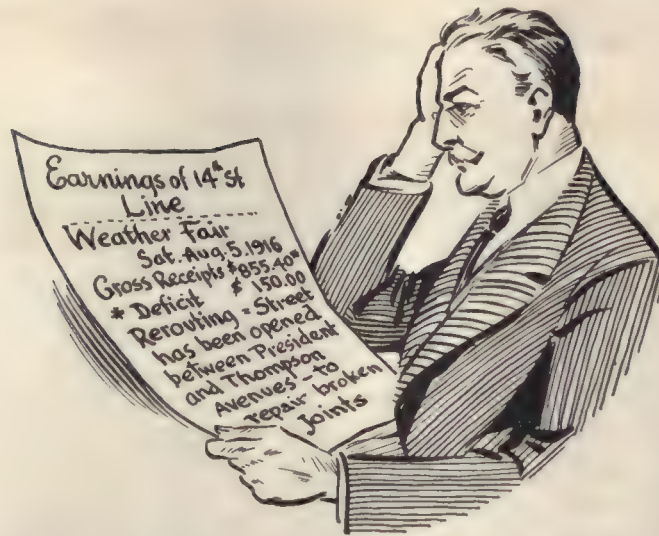
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California Corrugated Culvert Co.  
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Dixie Culvert & Metal Co.  
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**Iowa, Independence**  
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Lone Star Culvert Co.  
**Utah, Woods Cross**  
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Spokane Cor. Culvert & Tank Co.  
**Wisconsin, Eau Claire**  
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# Why Not Figure It Out?

When your master mechanic specifies case-hardened pins and bushings nowadays, you are willing to pay the price, for experience has demonstrated that they are worth many times the extra charge.

Why not apply the same reasoning to the Thermit Insert Weld?

Its first cost may be actually double that of various joints or welds.

But when it is in the ground it **stays** as long as the rail, for it is the rail!

No costly repairs and repaving which often exceeds \$12 per joint, even in granite paving.

No rough, bumpy juncture, but a truly continuous rail that saves your rolling stock and pavement.

No revenue losses caused by rerouting or slow single-track operation. In one large Eastern city, earnings dropped \$300 a day on a line undergoing joint repairs.

No friction with the public because of torn-up streets and delays in service.

## The Thermit Insert Weld is the Weld for Satisfying Railway and Riders

### GOLDSCHMIDT THERMIT CO.

120 BROADWAY, N. Y.

329-333 Folsom St., San Francisco

103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago





---

# Wyoming Mayari Red Edge Shovels

**T**HE Electric Railways of the Country have responded more whole-heartedly perhaps to this common sense development than any other industry—or at least they responded a little quicker.

Why?

Because the Traction Field has undergone so many changes—it has developed so rapidly that unless its engineers have the vision to see *at once* the possibilities or otherwise of new devices, they are left far behind by the Progressive.

It has surely been a race of the Sure and Swift. That is why the practically Country-wide adoption of Wyoming Mayari Red Edge Shovels by the Electric Railways is particularly gratifying to us.

We have had to earn it and have enjoyed earning it—but we were given the chance, and superiority was recognized and rewarded.

Wyoming Mayari Red Edge Shovels will produce Economy and Efficiency. These two results are guaranteed.

We have some interesting figures for distribution; also a new Red Edge Catalog.

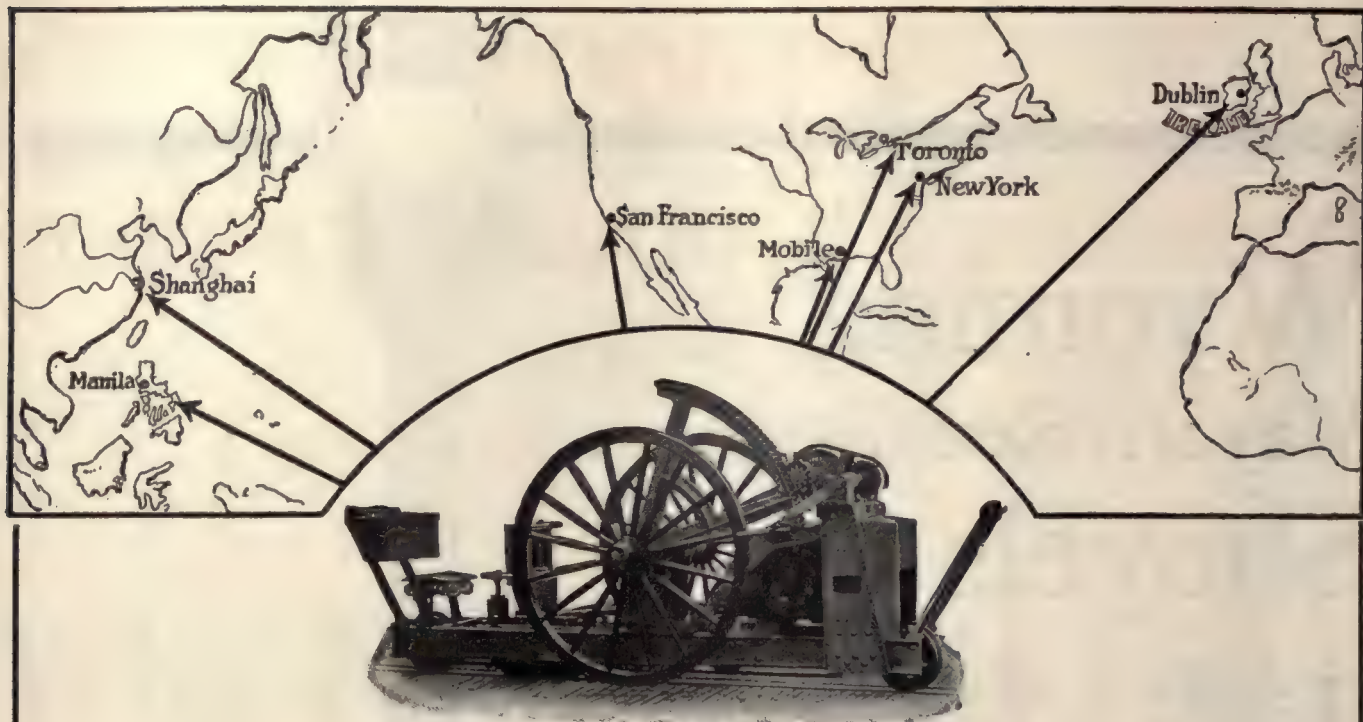


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## *The Wyoming Shovel Works, Wyoming, Pa.*

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## Its Fame Has Spread

Dublin, Ireland, recently ordered a Reciprocating Track Grinder.

Rail grinding no longer is a debatable question—it has proved essential in the efficient and economical maintenance of track on scores of electric rail-

ways in all parts of the world.

However, all types of grinders do not operate with the same efficiency—the same economy of time and labor—and with as little removal of the wearing surface of the rail as does the

## Reciprocating Track Grinder

Its superiority lies in its simplicity—it works like a planer—cannot gouge rails. It grinds equally well on curves and special work. It does not interfere with traffic. Unskilled labor can operate it.

The superior efficiency of the Reciprocating Track Grinder is most clearly and easily seen when its operation is compared on the job with other apparatus, and nearly all of the Reciprocating Grinders now in use in the United States have been purchased after such definite competitive demonstration.

Let us put this grinder to work for you—without obligation on your part—as a practical test of its efficiency and to demonstrate how it will soon save on your track much more than it will cost.

*Write today for particulars*

**Railway Track-work Co.**  
30th and Walnut Sts., Philadelphia

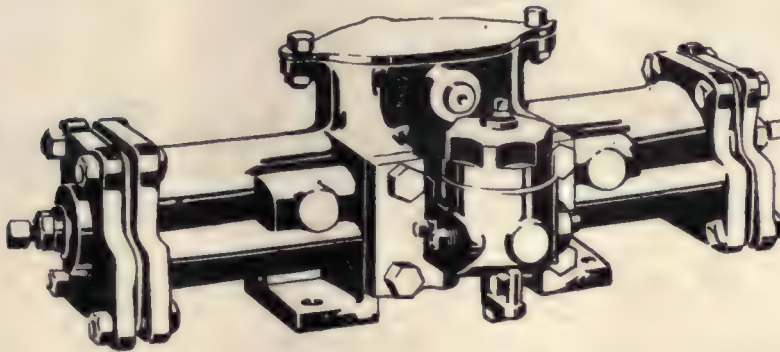


# 1600

## National Pneumatic Engines

are going on

### Four Hundred Bay State Cars



After most careful tests, the Bay State Street Railway has placed an order for 1600 National Pneumatic Engines, Type  $2\frac{5}{8} \times 4\frac{1}{2}$ , to go on 200 new Laconia cars of the Bay State Street Railway, and on 200 remodeled cars. These engines will be applied to double-end cars that will be used

For both left-hand and right-hand operation.

For both small city and large city operation.

For both suburban and interurban operation.

The choice of National Pneumatic Engines for this all-around service is a recognition of their versatility as well as their reliability.

Twelve cars of the same type for the Massachusetts Northeastern Street Railway will be fitted with the same type of National Pneumatic Engine.

# NATIONAL PNEUMATIC COMPANY

50 Church St. New York



515 Laflin St. Chicago





## Pulling the Load

Down hill and on the level, a load moves easily; but up a grade it is a hard pull. You wouldn't try to move a load up hill with the brakes set. But that is the practice in many powerhouses. Any ordinary oil answers the purpose fairly well when the engines are running light, but when the load comes on and the pull is up hill, then every bearing should turn with the minimum of friction—you need the best oil you can buy.

Specially compounded of the finest materials to meet the severest service, Galena Oils are unequalled for powerhouse lubrication. They are so exceptionally good that we stand back of them with a guarantee of service and cost.

# Galena-Signal Oil Co.

Franklin, Pa.





## Get Away From the "Overcoat" Roof It Eats Up Money in Lots of Ways

The wooden roof with an overall coating of white lead and canvas is an expensive roof to build; first, because white lead and canvas and their application cost money, and, second, because their application eats up time in the shop.

### Agasote Roofs

**Require No Covering—Only a Joint Binding**

That means a big saving in white lead and canvas—a big saving in labor—and a saving in power due to the decreased weight of roof.

Moreover, when you use a wooden roof with a white lead and canvas overcoat the oil in the lead eventually dries out and the lead cracks. This cracks the canvas and then you have a leaky roof and an expensive repair job.

Agasote Roofing is absolutely waterproof and the longer it is in service the harder and more impervious it becomes.

And an Agasote Roof if injured in an accident is easy, quick and inexpensive to repair.

Don't you think it might pay you to investigate Agasote Roofing?

### The Pantasote Co.

Manufacturers also of Pantasote—the most widely used and highly standardized railway car curtain material on the market.

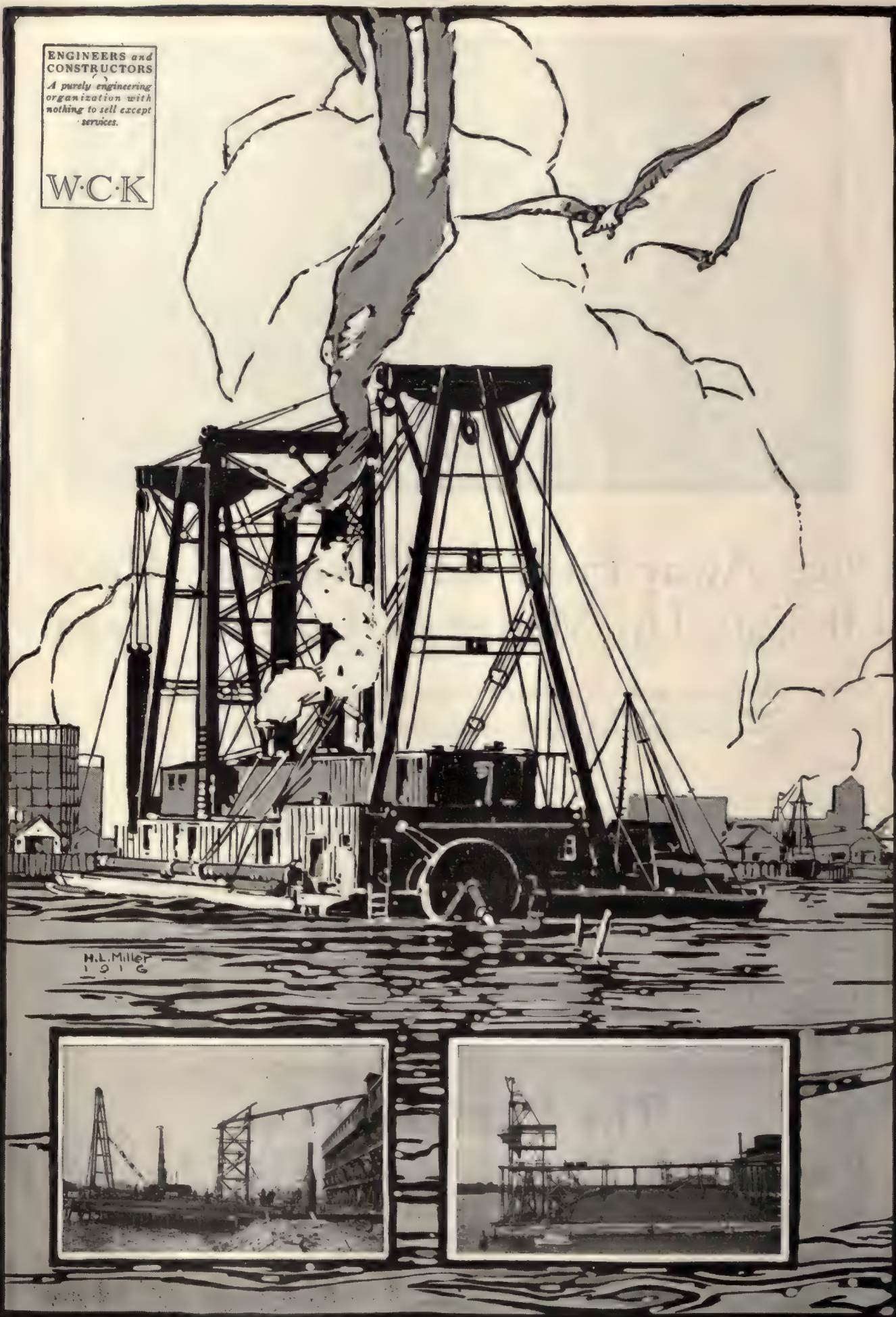
11 Broadway, New York

People's Gas Bldg., Chicago, Ill.  
797 Monadnock Bldg., San Francisco, Cal.



**ENGINEERS and  
CONSTRUCTORS**

*A purely engineering  
organization with  
nothing to sell except  
services.*

**W.C.K.**



ENGINEERS and  
CONSTRUCTORS

*A purely engineering  
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nothing to sell except  
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W.C.K

WESTINGHOUSE CHURCH KERR & CO.

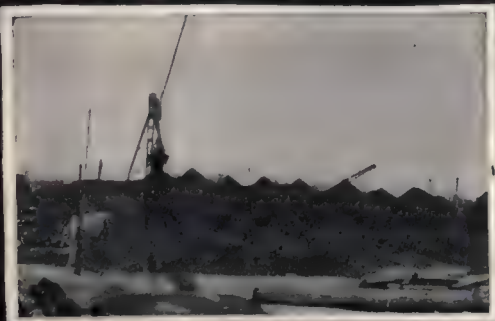
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Conway Building

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SAN FRANCISCO  
Pacific Building





**We are trying to keep  
this space as clean  
as the records of**

**All genuine graphited "Oil-less  
Bearings" have always been  
made at Bound Brook, N. J., in  
the United States of America,  
by the**

**Bound Brook Oil-le**

**Formerly the Grap**



# **“NIGRUM”**

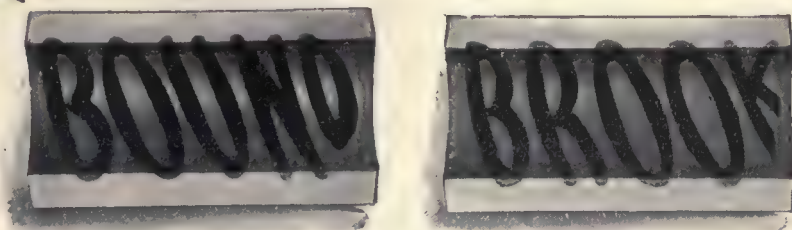
Trade Mark Reg. U. S. Pat. Off.



## **Impregnated Wood Bearings**

**“Nigrum” Impregnated Wood Bearings  
Are Made for Conditions Where Insulat-  
ing Qualities Are Required.**

**Full Data on Request**



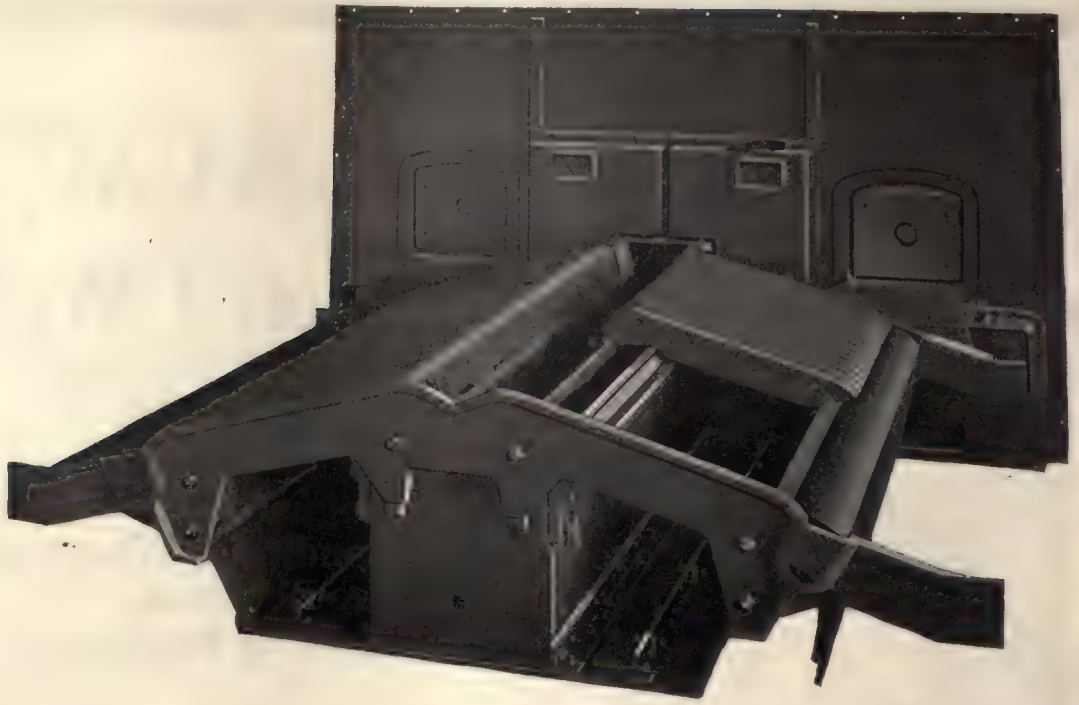
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## **Trolley Wheel Bushings**

# **ss Bearing Company**

**te Lubricating Co.**





# SIMPLICITY OF DESIGN AND OPERATION

ENABLES

# TYPE "E" STOKERS

to meet and maintain high  
ratings over the "Peak Load"

*ASK THE MAN WHO OPERATES ONE*

**COMBUSTION ENGINEERING CORPORATION**

Owners and manufacturers of

Type "E" Stoker—For Bituminous Coal.

The Grieve Grate—For All Hand-Fired Fuels

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Coxe Traveling Grate Co.—The Automatic Anthracite Stoker

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Pocock & Pollard Co.

BIRMINGHAM, ALA.  
Keiser-Geisner Engr. Co.

SALT LAKE CITY  
American Stoker Co.





The Tilting Angle of a Differential Electric Dumping Car May Be Held Indefinitely

## Differential Electric Dumping Car

The solid and substantial construction of the Differential Electric Dumping Car makes it suitable for carrying anything.

In the accompanying view a Differential is shown on a trestle over the coal storage of the East Liverpool Traction & Light Company.

Note that the loaded bins could remain tilted at any angle indefinitely without affecting the stable equilibrium of the car.

As a matter of fact, the tilting body moves

about 3 ft. to either side of the car before the dumping doors are automatically released.

Furthermore, the balance is unaffected by any condition of unequal loading in the three sections of the tilting body.

Finally, **one man** manipulating one electric controller can tilt, right or hold the car at any angle.

No other car is so **safe and simple**. How many do you want this Spring?

General Offices:

**Differential Car Co., Inc.** H. Fort Flowers 141 Broadway, N. Y.  
Pres. & Gen. Manager  
Southern Office and Works: Nashville

**ANTI-PLUVIUS**  
(Trade Mark)  
**Puttyless Skylights**

### Inside and Outside, This Train-Shed

of the Public Service Railway at Newark, N. J., is a conspicuous example of Drouvé day-lighting and "Anti-Pluvius" skylight construction. This construction gives greatest light area—and assures least upkeep expense. It is weatherproof and puttyless. The patented "bridge" construction assures safe and convenient cleaning of glass—a feature exclusive in "Anti-Pluvius" skylight.

Write for daylight data.

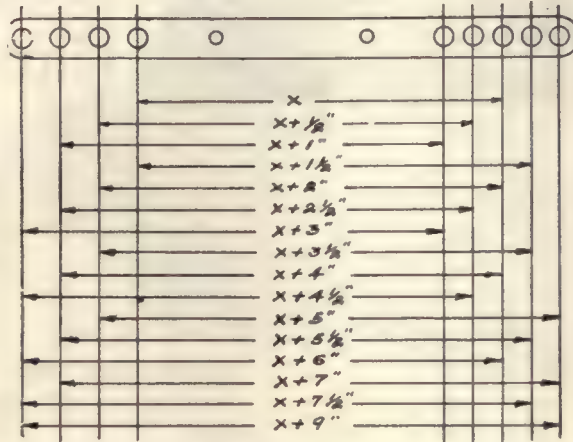
**The G. Drouvé Company, Bridgeport, Conn.**  
(180 N. Dearborn Street, Chicago)



# A Safe, Sane and Saving BRAKE LEVER STRUT

that has  
**No**

Cotters  
Loose Pins  
Broken Pins  
Hardened Pins



that has  
**No**

Wear  
Rattle  
Lost Bushings  
Loose Bushings

See how Easy it is to Adjust  
for Shoe and Wheel Wear

Here's a brake lever strut that is head-and-shoulders above anything of its kind on the market.

A strut that requires only two bushings—

The wear is transferred from a pin to the bushing, leaving the bolt wear-free and the car house men care-free.

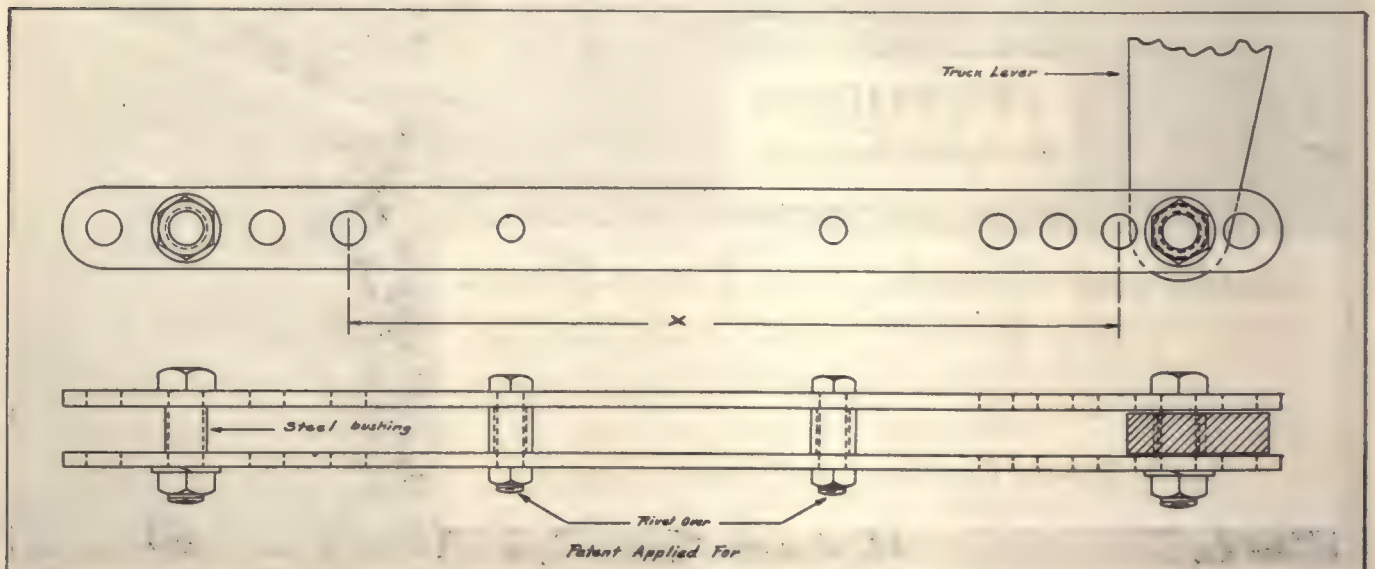
A strut that admirably combines lightness with strength and safety.

With the Smith-Ward Slack Adjuster it creates a Super Ideal Condition that makes for economy, safety and efficient operation.

Special Prices for the Combination.

Get the details.

**Smith-Ward Brake Company, Inc.**  
17 Battery Place, New York





# HESS-BRIGHT BALL BEARINGS OR MORE GENERATING EQUIPMENT?



If the energy demands of your cars are beginning to tax the capacity of your power plant, it is high time to look into the merits of Hess-Bright Ball Bearings.

Extra power plant, transmission, substation and feeder capacity is expensive, the cost of the power plant alone varying from \$50 to \$85 per kw., and of the average substation from \$16 to \$20 per kw.

Just figure out for how many years you could put off this expense if your demand could be cut 14 per cent.

That's what the New York State Railways found Hess-Bright journal ball bearings could do.

Why not begin to compare figures now?

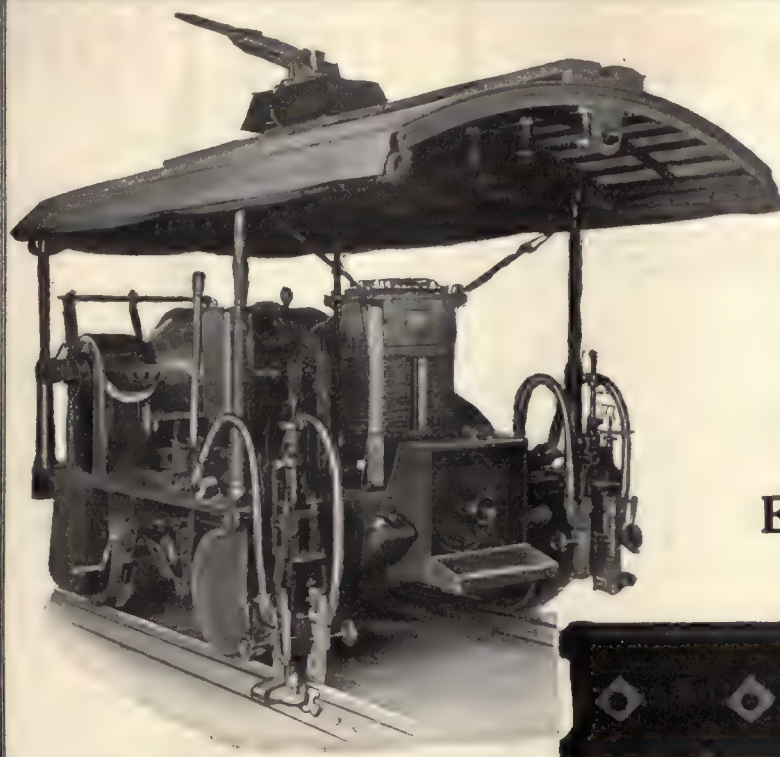
*Hess-Bright Ball Bearings  
have proved their longevity*



**THE HESS-BRIGHT MANUFACTURING COMPANY**  
**FRONT ST. & ERIE AVE., PHILADELPHIA, PA.**

HESS-BRIGHT CONRAD PATENTS ARE THOROUGHLY ADJUDICATED





## Here's the Bond That Gives—

full 8 to 1 contact area. The car welds the whole side of the terminal to the rail. Don't be satisfied with less.

### Electric Weld Rail Bonds



**The Electric Railway Improvement Co.**  
Cleveland, Ohio

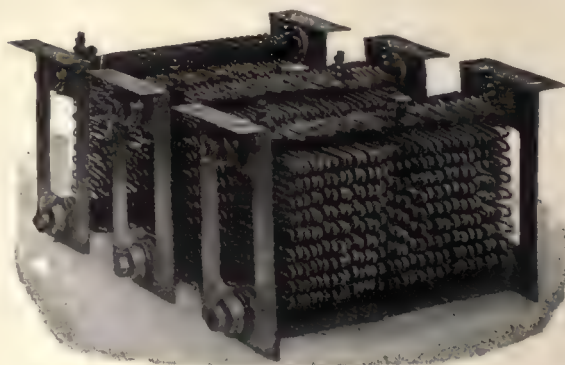
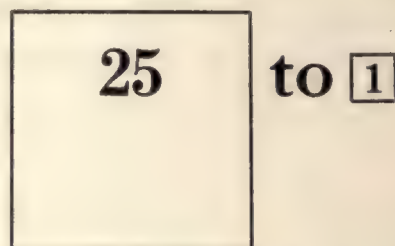
## The Odds Are in Favor of

### **EMB** Resistors

A resistor containing 100 grids has 100 contact points if of the ordinary cast single grid type. An EMB resistor only has or 4 joints, where the different sized grids are joined.

That means there is only one chance of trouble developing in an EMB resistor as against 25 chances in a cast grid.

Which do you prefer—a many-jointed, much-trouble cast resistor or a few-jointed, no-trouble, rustproof, breakproof *drawn* EMB Resistor? Answer by asking for data sheet.



**THE ELLCON COMPANY**  
50 Church Street, New York

GREAT BRITAIN:

Electro-Mechanical Brake Co., Ltd., West Bromwich, England

AUSTRALIA:

J. G. Lodge & Co., 109 Pitt Street, Sydney



# A Peter Smith Equation

## Heat + Ventilation = Satisfaction

"Heat is a mode of motion," if you recollect your physics definition.

But it doesn't move fast enough in a car. Besides, a good deal of it rises to the roof instead of moving along the floor to thaw out the toes of your passengers.

Hence, heat needs acceleration—and when you accelerate it you can mix in a lot of fresh air for good measure—that means Ventilation.

Peter Smith equipment is available for this purpose with either coal or electric equipment.

One is the Forced Ventilation Hot Air Heater; the other is the Forced Ventilation Electric Heater.

About which of these do you want facts—the first cost, the weight, the operating and maintenance expense?



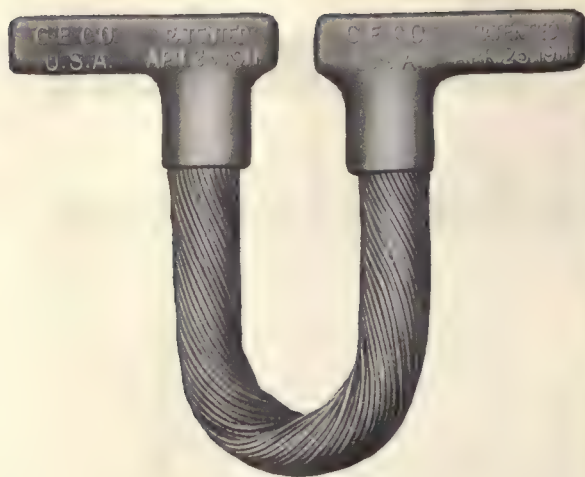
**The Peter Smith Heater Co.**

Detroit, Mich.

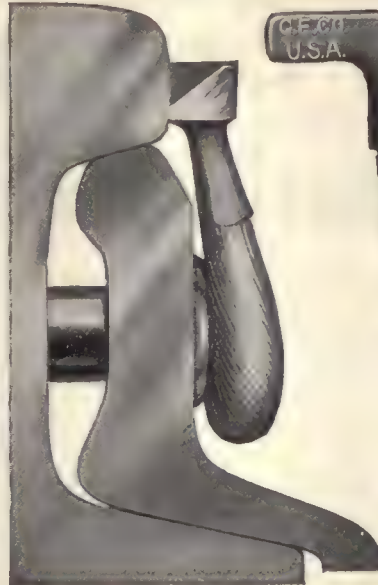
*Heater Specialists for Thirty-five Years*



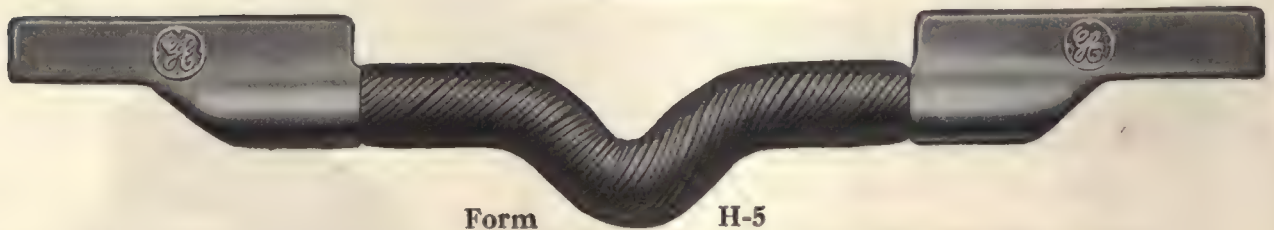




Form H-3

Cross Section of Rail  
Showing Form H  
Bond Installed

Form H-1



Form H-5

## G-E Form H Railbonds

(for application with acetylene flame)

The G-E Form H bonds have especially designed terminals suitable for application by means of the oxy-acetylene welding torch. The top surface of the terminal is sloped downward toward the surface which rests against the rail thus forming a recess for building up the weld. Ventilating ducts are provided at the bottom of this recess permitting a weld extending to the lowest point. This means a weld of large area and minimum leverage in case of attempt to pry the bond from the rail.

Consult the railbond specialist at our nearest office

# General Electric Company

Atlanta, Ga.  
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Dayton, Ohio  
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Youngstown, Ohio

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



# Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, OCTOBER 14, 1916

No. 16



THE ONLY TIME NOT TO START A PUBLICITY CAMPAIGN

## What Is the Best Time for a Publicity Campaign?

Almost everybody agrees that publicity is the best policy.

Two questions remain: When? How?

The best time for publicity is NOW and all the time hereafter.

The only time not to start a publicity campaign is when the air is full of bricks thrown by citizens, officials, politicians and strikers.

Corporation publicity is not an umbrella for a sudden thunder shower.

It is a permanent shelter from misunderstanding, unreasonable attack, unfair dealing; and permanent shelters are not built in a day.

Think over the publicity campaigns you know about. Nine out of ten have been started in a crisis.

For years armor plate manufacturers allowed to exist unchallenged the belief that armor—some of it blow-holed—was being foisted upon the government by a little coterie of greedy manufacturers at enormously profitable prices.

These manufacturers waited until the Senate had passed a bill to establish a government armor plant and not until then did they start to show that their armor had been good, had been sold on a small margin of profit, at a lower price than any other

government pays, and would be sold in the future for less than it would cost the government to make it.

Do not make the Bethlehem (Pa.) mistake; follow rather the example of Rehoboam of Bethlehem in Judea, who "fortified the strongholds and put Captains in them, and store of victual, and of oil and wine."

For if you are a public service corporation there is a prospective crisis of some kind staring you in the face.

It may be labeled "Franchise Renewal," "Labor Trouble" or "Service-at-less-than-Cost," but it is there in the road ahead.

Publicity is preparedness against these specters.

Publicity is a short name for a big, broad policy of day by day, in season and out of season, keeping the public well informed as to facts, the knowledge of which will create belief and confidence in your honesty, good intention and good-as-can-be performance.

Confidence cannot be created in a day; it can only be created by consistent and persistent education.

The time for publicity, then, is like the need for it, and that is all the time.



## CONVENTION OF THE AMERICAN ASSOCIATION

The thirty-fifth convention of the American Electric Railway Association ended yesterday and compares well with any of those which have preceded it. Atlantic City always brings out a large attendance, and the convention this year was no exception to that rule. The final figures of attendance had not been compiled at the time this page went to press, but the tentative figures indicated a considerably larger number of persons present than at the 1914 convention, the last previous one in Atlantic City. The exhibits, although less numerous than hitherto, were good in quality and especially interesting. Perhaps the absence of a special exhibit last year added to the interest with which the exhibits were viewed.

The speakers on the program of the American Association consisted of Colonel Baker and Captain Wilson, who spoke on preparedness at the meeting on Tuesday; Ivy L. Lee, who presented an address on publicity on Wednesday, and the historical talks on Thursday. We have not included in this list the excellent paper by Mr. Kealy on valuation, that being really a part of the report of the committee on valuation. Of these addresses, the one most closely related to the internal affairs of the companies was that by Mr. Lee, and we hope that his straightforward treatment of the subject of publicity will be of help in shaping the future policy of both the individual companies and the association on this important subject. There is no mystery about modern methods of publicity, as we have pointed out many times in these columns, and as we are showing in the series of cartoons now being published in this paper. But if effective results are to be secured those who are endeavoring to secure publicity must be in thorough sympathy with both the idea of publicity and the manner of living which makes such a policy effective. We wish that the association, which is the logical body through which the local companies should co-operate in their individual campaigns, would do more to help the local companies in this regard.

A notable feature of the American Association committee reports was the report presented by Mr. Mortimer in behalf of the sub-committee on social relations of the committee on public relations. Owing to length of this report it is impossible to print it in this issue, but it will be published next week. It shows what can be done for the industry by assiduous work, and it can well serve as a model next year for all the other sub-committees of the committee on public relations as well as for the main committee. Public relations are generally recognized as being the most important subject before the association. Proper attention to this matter is the foundation of the fare question and the franchise question because unless the authorities and the public understand the problems of the railways improvement in their condition is almost hopeless. In our opinion the time has come for serious realization of this situation. The public relations committee must do much more than it has in the past if it expects support from the industry. It should cease to mark time and should lead in this important matter.

## PROGRAMS OF THE AFFILIATED ASSOCIATIONS

As the Atlantic City convention closed but yesterday, it is difficult to view it in true perspective at such close range. However, it is possible to indicate a few high points in the proceedings of the affiliated associations which are significant of current tendencies in the work of these associations.

The engineers seemed most concerned with the promulgation of standard specifications for materials and manufactured products. A great deal of money and a much greater deal of time, as measured in terms of money, have been expended in producing an imposing array of standards. At the present time the standards seem to be getting ahead of the industry, and the pressing problem before the Engineering Association is to secure a wider adoption of them. The association may well pause in the development of new standards, as it proposes to do, and study the adaptation of the present standard to operating conditions, as well as try to educate the industry in the economical adaptation of the standards to its requirements. It is easier to understand the present condition when one considers the enthusiasm, assiduity and thoroughness with which the compilation of the *Engineering Manual* has proceeded.

The Transportation & Traffic Association has been undergoing a heart-searching process during the meeting just closed which is very creditable to it, especially in view of its present and past achievements. This association has problems which are, perhaps, the most difficult of all to solve. In contemplating the magnitude of its field the Association has undertaken ambitious researches. In these much has been accomplished. However, as the Association frankly says, the problems have been so large that it has been difficult to obtain definite solutions or to affix the "Q. E. D." at the end. As one T. & T. official said to the writer, at the convention, "Our problems are very intangible, and therefore difficult of solution. We can well envy the engineers, who seem to be able to proceed from premises to conclusions. Mathematics doesn't help the transportation men much."

The Claims Association meeting this year illustrated the fact that the legal aspects of claim work are rapidly becoming subordinate to the larger phases of accident reduction. The claim agent has no reason to apologize for his existence. Humanitarianism comes within his ken as well as the making of a just settlement. He is perfectly willing, on behalf of his company, to acknowledge fault in case of accident, if such exists. He wants justice for the present, and knowledge of how to avoid a repetition of the accident for the future. If we gage the situation correctly, these were the underlying principles of this year's association program. The Accountants' Association meetings are discussed in the next column.

The convention is over, and we hope that the managements of our electric railway properties will realize the importance of having their subordinates assimilate the fruits of this convention and lend a hand in carrying out the plans which are being formulated.



## FACTS—AND THE WIDER VISION

Running through all the varied papers presented before the Accountants' Association this week was the idea that actual facts are needed for the solving of many electric railway problems. The efficient ascertainment and collation of facts through the use of an expert statistician, the thoroughly consistent use of facts instead of mere opinions in going value and other valuation matters, the frank presentation of facts to the public on franchise, investment and operating points—all these were among the matters touched upon at the several meetings.

Utility accountants are accustomed to dealing with facts, but those officials who in general determine public relations policies do not all rigidly adhere to facts in their publicity work. Too often argument and opinion take the place of actual data, or debatable theory the place of indisputable actuality. Moreover, the public often acts through prejudice, distrust or mistaken opinions about utilities. Such, of course, should not be so in either case. As Professor King stated, the modern utility and the public both have duties that are by no means antagonistic. On the one hand, the utility should present at all times facts and facts alone; on the other, the public should base its judgments on facts and nothing but facts. In no other way will the public relations of utilities show the desired improvement.

The association this year showed commendable progressiveness in the desire to secure criticisms from outside experts capable of analyzing its work in an unprejudiced way. There seemed to be, however, a tinge of disappointment when one speaker touched upon what he deemed to be inconsistencies and fallacies in commission accounting regulations, thus indirectly hitting at some of the provisions of the electric railway classification of accounts. We are not in accord with some of his criticisms, but, leaving this aside, we wish that the accountants had met more directly the points at issue.

The standard classification of accounts, without doubt, represents the laudable achievement of men trained by actual experience as to the needs of the industry, and changes in it should be made only after a most considerate examination of their worth. On the other hand, it will doubtless be susceptible of at least slight modifications under the laws of progress, and it is quite possible that with his wider vision the certified public accountant may in time see fundamentals underlying all industry to which the electric railway classification should be brought more closely in accord. Whether the future may bring actual changes or not, however, it is vitally necessary that the members of the Accountants' Association continue to hold an open mind on the subject, and that in mutually felicitating themselves as to past accomplishments they do not neglect to consider with all seriousness the best in modern accounting, wherever developed or by whomsoever suggested. Blind worship of the past or a Phari-saïc attitude of superiority would only dim the luster of past accomplishments.

## MANUFACTURERS IN THE ASSOCIATION

Although progress was made at Atlantic City this week in determining the future status of the manufacturers in the American Electric Railway Association much remains to be done. The Manufacturers' Association will be continued, and this we consider a wise move if for no other reason than that it provides a medium through which the manufacturers may exchange views as regards matters which come up in association work of special moment to them as a group. Later it may seem wise for the Manufacturers' Association to apply for an affiliated association charter, although such a charter necessarily would have to be quite different from those of the existing affiliated associations, as the purposes of the Manufacturers' Association are different from those of the present affiliated associations.

It has also been decided that manufacturers' representatives will be eligible for appointment upon any of the committees of the parent and affiliated associations where the services of such representatives would be of value to the industry and that the manufacturers as a whole will be represented by five members on the executive committee of the parent association. As this committee has consisted hitherto of nine members, this will mean that the committee will be increased to fourteen and that the representation of the manufacturers will be more than one-third of the whole. In this connection it might be said that the aggregate amount of dues paid by the manufacturing companies for the ten months' period of the association ended Aug. 31, 1916, the period shown in the secretary-treasurer's last report, were about 11½ per cent of the aggregate of those paid by the railway companies. But last year was a half year for the manufacturers, and with a full year and the same membership the dues would amount to practically 23 per cent. If the rent of exhibit space is added, it would make an additional 26 per cent, while the money contributed through advertising in *Aera* would add another 25 per cent of the annual dues of the railway companies during the last fiscal period. The total of these contributions then would be 75 per cent of the dues of the railway members, if we assume the same membership this year as last year.

We do not quote these figures as an argument for a larger representation of the manufacturers on the executive committee now because we realize that the representation need not be exactly proportioned according to the funds paid into the association's treasury and also because we realize that many details of the organization still remain to be worked out. Indeed, this is one of the principal duties of the incoming executive committee. We believe, however, that certain main principles should be recognized in this reorganization. One of these principles is that member companies, both railways and manufacturers, are on the same basis so far as privileges and responsibilities of office are concerned. The association is no longer one of railway men alone, and while it may seem strange for manufacturers to be eligible for the vice-presidencies or the presidency of the association we see no alternative if the member companies are to be equal in every respect.



# Achievements and Prospects\*

A Review of the Activities of the Association During the Past Year—Effects of the European War on the Electric Railway Industry

By CHARLES L. HENRY

President Indianapolis Cincinnati Traction Company, Indianapolis, Indiana,  
and of the American Electric Railway Association

*Mr. Henry began his speech with a reference to the meeting last year in the Far West and spoke of the impressions made on those who took the trip, of the marvelous electric railway transportation systems inspected, the royal entertainment provided to the delegates, and the pleasure of the many meetings with friends, old and new. Taking up the problems of the industry he continued as follows:*

THE twelve months' cycle now ending is one that will be long remembered. The great European war, in which there are now fourteen countries involved and which has been in progress more than two years, still continues with unabated fury. So wonderful and far-reaching has been the influence of this war that the United States not only has not escaped from its influence, but, on the contrary, every channel of business, all the industries of the country, all the people of the country—bankers, tradesmen, manufacturers, workmen and farmers—all to a greater or lesser extent have been and are vitally affected. Many of our manufacturing industries are crowded by the production of war munitions and other war supplies. Exports of the products of our factories and farms, furnished to the nations at war, have in turn brought back a stream of gold into the pockets of the American producers. The profits arising from this export business, occasioned by this unusual and extraordinary demand from across the sea, have been such as to intoxicate the American people, and spreading out from the business centers, into almost every channel of trade and into every community throughout the land, there has developed a feverish, unnatural and unhealthy condition, until the American people have almost lost their moorings.

Prices of all commodities, products of the farm and workshop, have increased to such an extent as could not have been anticipated in a country not in actual war; speculation of all kinds has been stimulated, and a quiet people, who have heretofore always been content with ordinary business conditions, have been carried away into the whirlpool; usual every-day business has become insipid, and nothing in a business way that

does not promise quick returns and immense profits seems to satisfy their desires. Employment under ordinary conditions and at even reasonably advanced wages is by the workmen looked upon with contempt. In order to secure the necessary workmen in factories producing war supplies bringing enormous profits, wages have been abnormally advanced and workmen have been enticed thereby from their ordinary avocations. The whole industrial body has become restless and dissatisfied, demanding increased wages, sometimes justified, but in many cases wholly without the bounds of reason. This very naturally has been accompanied by a decreased interest in the work, and altogether there have been created conditions which make it impossible for an ordinary business to be conducted in a successful and profitable manner.

From the injurious effects of this general condition our industry has not escaped. The cost of all supplies for maintenance of our properties has been greatly increased; it has been neces-

sary to increase the wages of employees in order to hold them and to help them, as far as at all possible, to meet the advanced cost of living with which they have been brought face to face; taxes have been made higher because of reckless appropriations and expenditures by legislative bodies and public officials, this being always incident to such conditions as now surround us. From all these we suffer and are not able in turn to increase the price of what we have to sell. Almost all other lines of industry, when the cost of production increases, can save themselves from the effects thereof by increasing the price of their product. The prices we receive for transportation of passengers, freight and express are fixed by ordinance, by law or by the regulations of some commission. Between the increased cost of production on the one hand, and no increase of compensation on the other, many



\*Abstract of address of the president of the American Electric Railway Association delivered on Oct. 10, 1916, before the convention in session at Atlantic City, N. J.



of our companies have suffered almost to the point of utter destruction.

Even in communities where, by reason of the stimulated business conditions, there has been a great increase in the number of passengers carried, the increase in income has been greatly, if not entirely, offset by the increased cost of operation.

#### CONDITIONS TO BE MET AFTER WAR

When the European war will close; whether we ourselves may not yet be drawn into it; or what may be the final effects upon our business conditions, are all matters of speculation, about which none of us can possibly speak with anything like certainty. This much we do know, however, that even if the war comes to an end in the near future, its baneful effects upon our business and industrial life will remain with us as a curse for many future months, if indeed it does not remain in perpetuity to injure and hamper us in many devious ways. Only after many years can we at all hope that the people will again be satisfied with ordinary business conditions such as they were accustomed to before the war, and during all of those years our industry, like others, will suffer from the conditions born of the war.

In the European countries, now being devastated, there is being forced upon their people, by reason of the demands growing out of the war, the most wonderful industrial efficiency that the world has ever seen. May we be permitted to hope that this country will not stand idly by and suffer the serious effects of the keen competition which this foreign efficiency is sure to bring, but will use every means possible not only to protect our home markets but to build up our own industrial efficiency to its highest point, so as to equal, if not surpass, the industrial efficiency of our European competitors. If this hope can be realized, we may see such a development in a business and industrial way within this country as has not heretofore been dreamed of. If this is done, we shall attract to our shores many people from the better portion of the population of foreign countries, who will be anxious to escape from the destructive taxation sure to follow the war, and we shall become a greater nation than ever contemplated by the wildest imaginations of our most enthusiastic citizens. It is to the future growth and development of the country that we must look for the curing and overcoming of evils coming to us as a result of the European war.

Surrounded, as we have been, by many discouragements during the past year, this association has gone steadily forward working for the industry it represents, holding what ground it could and advancing wherever

possible, and has made a record for the year of which it may well feel proud.

#### MEMBERSHIP OF MANUFACTURERS

As an outgrowth of a recommendation made by President Allen at the San Francisco convention, the association, last February, at the mid-winter meeting in Chicago, changed its constitution so as to admit to full membership in the association companies and individuals engaged in the manufacture and sale of electric railway supplies. For a number of years past the American Electric Railway Manufacturers' Association, composed of manufacturers and sellers of electric railway supplies, had done active and efficient work in connection with this association

in providing for and taking care of the exhibits and the entertainments at the annual meetings of the association and in many other ways aiding in the work in which we were engaged, but until the amendments to the constitution referred to were made, we did not have these people as members of this association, meeting with us around the council board, discussing and helping to shape the policies of the association, and uniting their efforts with the railway members in the committee work and other activities of the association. Today, as a result of these amendments, for the first time in the history of the association, we have seated with us, as full-fledged members, men engaged in the manufacture and sale of electric railway supplies. This increased membership has brought and will bring to us greatly increased strength and efficiency. The wisdom of the change has been strongly shown by the ready and enthusiastic work which has been done by the various committees largely composed of manufacturers, to whom was intrusted the arrangements for the ex-

hibits at this convention, and by whom the various entertainment features have been provided. No more prompt and effective work has been done by any committees of the association during the past year, and this week you are the favored beneficiaries of this work.

The association committee on company membership consisted originally of railway men only, because when it was appointed the membership of the association was limited to railway men. To this committee there was added a like number of manufacturers, and they at once entered upon the work intrusted to them and have exhibited great efficiency therein. The success of the convention proper, the wonderful exhibits prepared for our inspection and the heretofore unsurpassed program of entertainments, all attest the enthusiastic spirit with which our enlarged membership has taken hold of the work. Recently, when it was found necessary to send

### Getting at the Root of the Labor and Wage Problem

*In his presidential address at Atlantic City this week President Charles L. Henry made the following trenchant suggestions:*

**T**HE companies engaged in the electric railway business are quasi public corporations doing for the state and people a work delegated to them. They stand in an entirely different position from manufacturing and other strictly private business enterprises. A dispute or disagreement about wages or conditions of labor should never be allowed to develop into such a state as to interfere with the operation of these properties because, if for no other reason, this is an injury to the public from which the companies have received their commissions to construct and operate their properties.

What is needed is that there shall be a duly authorized public body to which either party feeling aggrieved may apply for relief and have the matter fairly determined without a resort to a strike or a lock-out.

There should also be legal inhibition of all strikes and lock-outs on public service properties.

If the cause of such strikes and lock-outs is removed, there is no reason remaining which will justify either a strike or a lock-out.

Let us, as representatives of this great electric railway industry, take a stand in favor of a just and orderly solution of these problems and we shall in so doing not only do a good thing for our employees and ourselves but also for the great public which we serve.



out a hurry-up call to the members of the association to assist in securing the exemption of electric railways from the provisions of the threatened so-called eight-hour law, recommended by President Wilson, the manufacturing members quickly responded to the call with the same enthusiasm shown by railway members.

The work of amalgamation of the railway and manufacturer members has been but commenced and the complete amalgamation can be brought about only in the course of time. I have no definite recommendation to make at this time except to say that the manufacturers must be represented eventually on the executive committee. There is no constitutional provision at present by which they can officially be members of this committee, but I suggest that this meeting the association elect two from among the manufacturer members who can sit *ad interim* with the executive committee and aid with their advice.

#### NECESSITY OF CONCERTED ACTION

At no time in the history of the association has the need of its work been better exemplified than during the recent months. The growth of the nation's population, accompanied by the increased magnitude, multiplied numbers and diversification of its industrial and business interests, has created such a condition as makes it impossible for any business or industrial interests to make themselves heard or felt in matters of legislation and administration, whether national, state or municipal, unless they are grouped together in a compact, organized form, thus being able to present promptly and effectively their views on any matter in which they are interested. Nor is it possible that they can in any other way exert the necessary and proper influence upon the public at large which will bring about a clear understanding of controverted matters and cause the people to see, as they should, the questions under consideration. "United we stand, divided we fall," is truer to-day than ever before.

Our association, as the organized representative of the electric railway interests of America, in this day of organizations, stands out strongly and has been and is doing more effective work than any other similar organization with which I am acquainted. The form of its organization and plan for carrying on its work commends itself more and more, year by year, for its efficiency and the results attained. Learning from the experience of legislative and other bodies, it has adopted the plan of doing through committees much of its work which requires careful investigation and study. Following this plan, not only the American Association itself, but also its four affiliated associations have from time to time constituted committees to consider and report upon matters of special interest as well as those questions which are more constant in the attention which they require. This organization and this plan of work make it possible to take up and give proper attention to any question in which the industry is interested, and to develop plans for the benefit of the various member companies.

#### PROGRESS DURING THE YEAR

During the past year the work has been carried forward by various committees on some of the most pressing subjects, among which I may name that of valuation, electrolysis, overhead construction, public relations, operation of motor vehicles, compensation for carrying United States mail, insurance and taxation, and on most of these much progress has been made. During the year a number of questions have come up before Congress and the Interstate Commerce Commission in which we were interested, and the manner in

which they have been handled by the association, through its federal relations committee, is a marked illustration of what can be accomplished by intelligent, painstaking and united effort. Only a few weeks ago we were suddenly apprised that the President would recommend to Congress the passage of the so-called eight-hour law for interstate carriers. At once it was evident that there was great danger that electric railways doing interstate business might, very disastrously to them, be included in the provisions of such a bill, and as but few days remained of the session of Congress, whatever action was taken would be quickly taken and without very much consideration. The association, led by its committee on federal relations, at once took up the question and succeeded in getting the electric railways of the country exempted from the provisions of the bill. How close a call we had you will understand when I tell you that the bill, which finally became a law, when introduced in the House, did in its general terms include such electric railways, and it was only through the influence of this association, exerted as stated, that an amendment exempting them was secured on the floor of the House.

#### LAST MID-YEAR CONFERENCE

The mid-year conference of the association, held in February at the city of Chicago, in respect to the attendance, the spirit manifested, the program produced, and the work accomplished, was perhaps the best mid-winter conference the association has ever held. A large number of members and invited guests were seated at the dinner given at the Congress Hotel and were addressed by speakers of prominence, to the very great interest of all present. Senator Underwood of Alabama did the association the honor of being present at the dinner, and delivered a very interesting, valuable and instructive address. These mid-winter conferences are constantly increasing in their value and benefit to the association, and those of you who have not been attending them should in the future avail yourselves of the privilege.

#### BUREAU OF INFORMATION

The bureau of information, maintained at the headquarters of the association, has been of great and far-reaching benefit. It has usually been able, on request by various companies, to supply promptly desired information on every phase of the electric railway industry. It is at all times provided with a vast amount of valuable information on operating and other questions collected from the member companies. If the information requested is not available and on file at the time, special investigations are conducted and the information secured with a minimum of delay. Many companies more and more avail themselves of this service, which costs them nothing except the dues which they pay as association members.

#### PROBLEMS OF PUBLIC RELATIONS

There is no part of our work but in some manner brings us in contact with the public. The very nature of our business is such that we constantly, at every turn, deal with some portion of the public, either directly or through their official representatives. Congress, the Interstate Commerce Commission, State legislatures and public service commissions, city and town governmental bodies, all have to do with matters regulating our business and are all to a great extent influenced by the attitude of the citizens themselves. Passengers riding on our cars, shippers of freight and express, damage claimants, trespassers on our rights-of-way, travelers on the public highways where our



tracks are laid, are all parts of the great public, and with all of these we must deal. The people at large are interested in the kind of service we give and are always ready to complain of what is wrong, if even sometimes slow to praise what is right. If we are unjustly taxed, it is usually because the great body of citizens, either from want of knowledge on the subject or on account of prejudice, thinks we should be thus taxed. In case of labor trouble, the attitude of the public is of the greatest importance. Indeed, it would be difficult to point to anything connected with our business which does not bring us in some way to deal with the public. How great is the importance, therefore, of our public relations is perfectly evident to all of us, and all of us have, with more or less success or failure, been using our best endeavors to smooth out whatever difficulties arise between our various companies and the public we serve. The *ELECTRIC RAILWAY JOURNAL* and *Electric Traction*, as well as the *Aera*, our association magazine, have given great and constant attention to these matters, and much valuable work has been done by them. The association, through its committee on public relations, has in successive years been considering some of the greater questions lying within this field, and while they have not accomplished as much as they desire, they have made substantial progress along several important lines. The best thought that can be brought to bear on these questions should be devoted to their study, to the end that we may discover and put into use and operation the most desirable plans for bettering our situation in relation to the public.

#### VALUE OF COMPANY SECTIONS

The development of the company section movement in the association still continues very promising. During the year a number of new company sections have been organized, and the interest in the old as well as the new sections has been increasing. Nothing in the work of the association gives better promise than the enlargement and development of this movement. It was my privilege during the year to visit a number of the company sections and address them at their meetings. This gave me an opportunity to study better than I ever had been able to do before the work of the movement, and with this increased knowledge of the work I wish to impress urgently upon you the desirability of the organization of company sections among the men of your various companies. By becoming members of a company section, they receive direct the *Aera*, and get various other benefits, but the greatest advantage perhaps is that they feel that they are actually personally members of this association and, therefore, take greater interest in its work.

*Aera*, during the four years of its publication, has been growing steadily stronger in the work which it is doing and constantly gaining from the association members a higher appreciation of its usefulness and benefit to them and all interested in the industry. As was expressed very clearly in an article in the magazine by the president of the Transportation & Traffic Association, this magazine gives us a "convention all the year round," as it forms a medium of communication between association members on any and every subject relating to the industry. It now occupies a position from which it is having a valuable influence directly upon the public mind as well as through the medium of other publications influenced by it throughout the country. The cost of its publication has been somewhat increased during the past year, more especially on account of the advanced price of paper, but even with this it is remarkable that so good a publication has been issued without greater expenditure. You will be pleased to know that the receipts from advertise-

ments during the past year have been increasing constantly, and the margin between the amount received from advertisements and the total cost of the publication is growing smaller and smaller. The indications are that, in the not distant future, the publication of the magazine will cease to be any financial burden to the association.

You will no doubt listen with great interest to and be pleased with the report of the advisory committee having charge of this publication. Its work has been constant and painstaking, and the association is justly proud and appreciative of its success.

#### AS TO CARRYING OF MAIL

There is one matter which, year after year, has occasioned a great deal of work and much anxiety on the part of our committee having the subject in charge. I refer to the compensation paid to electric railways for carrying United States mail. As shown by the report of the committee at this convention, the last Congress cut down the amount of the former appropriation for carrying of mail by electric railways within cities. In addition to this, the compensation paid interurban electric railways for the carrying of United States mail is not and never has been reasonable, even as compared with the compensation paid steam railroads. There seems never to have been a clear understanding in the Post Office Department of the value of the service rendered by electric railways in the carrying of mail. It will be necessary to do some very active and efficient work in connection with this matter if the electric railways are to be fairly treated, and I request your hearty co-operation in these matters. As illustrative of the situation regarding mail service by interurban roads, let me read to you a letter from Vice-President Collins of the Michigan United Traction Company, stating fully a case in point:

Referring further to our conversation with regard to the compensation received for carrying United States mail, beg to advise that while we were operating the Michigan Railway Company as a steam road between Augusta (called Gull Lake Junction) and Allegan, we were paid on a weight basis and received for this service compensation of \$2,232.01 per annum, service being six round trips per week, and the distance between Gull Lake Junction and Allegan 34.81 miles, which would figure per annum 21,791.06 miles, making the receipts per mile carried of 10.24 cents. However, we did not carry the mail from Gull Lake Junction to Allegan, but carried it from Gull Lake Junction to Monteth, a distance of 21.91 miles. This later was changed from Gull Lake Junction to Doster, a distance of 14.45 miles. The compensation received for this service was \$2,232.01 per annum, the same as though the mail was carried through to Allegan.

However, when electric operation was put into effect on this division, notice was received from the Postal Department that we were to carry the mail two round trips daily except Sundays between Gull Lake Junction and Doster, a distance of 14.45 miles, for which service a compensation of \$542.74 per annum was to be paid, making the receipts per mile carried of 3 cents. In other words, in place of paying \$2,232.01 per annum for this service they are now only paying \$542.74, and we are making two round trips daily instead of one. The electric railway, therefore, is furnishing additional service, and receiving for the same \$1,689.27 per annum less.

#### WORK OF COMMITTEES AND ASSOCIATIONS

Our four affiliated associations have been doing great work. The programs for the various meetings which they will have during this convention make it desirable that you should all attend such of the meetings as possible, and by so doing you will become fully advised of the valuable work that these associations are doing.

The report of the committees of the American Association, and also of the affiliated associations, are full of interest and should be carefully read by every one interested in the work of the association. It would not



be wise for me to undertake to give a synopsis of any of these reports; they should be read in full and carefully studied in all their bearings.

In this connection I want to call your attention to a matter deserving your most earnest consideration. As I have indicated, a very great part of the work of the American Association and of its affiliated associations is, and must necessarily be, done by committees, and this work is of the very greatest importance to the association and to the industry. It cannot be properly attended to and the desired results secured unless members accepting appointments on the committees attend the meetings of the committees and otherwise give the necessary attention to the work in hand. This we know will require some sacrifice and some trouble, but they should make this necessary sacrifice and go to this necessary trouble, and give their best efforts to the work. I especially appeal to the management of the various member companies that they urge such of their people as may be committee members to give to the work of the committees the proper time and attention. This, in many cases, has not been done, and the association work has correspondingly suffered.

#### CO-OPERATION OF THE TECHNICAL PRESS

As the years have come and gone the association and the industry have had in the *ELECTRIC RAILWAY JOURNAL* and *Electric Traction* staunch and constant friends and forceful supporters, and to them we owe, and all feel, a heavy debt of gratitude. It is pleasant to know that the companies publishing these magazines were among the first to become full-fledged members of the association under the amended membership provisions adopted last winter. The owners of these publications and their staffs of able assistants have always been vigilant, every-day friends of the association. By their counsel and advice, as well as by their public advocacy, they have been many times of the very greatest help.

#### ASSISTING THE WAR DEPARTMENT

Within the last few months the word "preparedness" has been worn almost threadbare and has been made to cover some of the most foolish suggestions before the American people. The first general use of the word was, however, the outgrowth of the loyal and patriotic feeling of the nation that the present European war was a warning to us which should be heeded; that we should see to it that we did not allow ourselves to remain in a helpless condition not able to make proper defense in case of attack by any outside power. Some, yes, many things, have been accomplished looking to this which give great promise for the future, even though along with them other things have been done which are serious elements of weakness. It is our duty, as a part of this great people, to do our proper share of the work necessary to see that our nation is prepared to protect itself against all comers. During the past year a committee was appointed, with General Harries as chairman, to co-operate with the War Department in laying plans for help by electric railways in the defense of the country in case of war, and this committee has been at work along these lines with indeed very satisfactory results. In to-day's program a place has been given to the consideration of our duty in the general work of preparedness.

#### LABOR AND WAGES

With the recent war prosperity there has come renewed and intense wage and labor agitation with the usual resulting bitter controversies and strikes. The conditions have in many instances reached an unbearable stage, so much so that now, more than ever before, the people at large have become aroused and alarmed,

as the very foundations of society seem threatened. The result is that the best thinkers among our patriotic citizens are seeking for a remedy that shall avert the threatened evil results.

The companies engaged in the electric railway industry are quasi-public corporations doing for the State and people a work delegated to them. They stand in an entirely different position from manufacturing and other strictly private business enterprises. A dispute or disagreement about wages or conditions of labor should never be allowed to develop into such a state or condition as to interfere with the operation of these properties because, if for no other reason, this is an injury to the public, from which the companies have received their commissions to construct and operate their properties.

In order to avoid the oft-threatened injury to the public two things are necessary. There must be as a first step a way provided whereby all controverted questions about wages and labor conditions, concerning which the immediate parties in interest cannot agree may be considered, determined and settled by some duly authorized public body that will carefully and conscientiously weigh all of the matters bearing upon the questions under controversy and in its decision do even and exact justice between the parties concerned, including the great body of the people. The old and usually resorted to system of arbitration does not meet the needs of the hour. Usually it is not resorted to until much of the damage to the public, the companies and the employees is already done; and when resorted to the decision of the arbitrators is frequently unsatisfactory to all parties because it is not always based upon the exact principle of justice and right which in such matters as well as all others should ever prevail.

What is needed is that there shall be a duly authorized public body to which either party feeling aggrieved may apply for relief and have the matter fairly determined without a resort to a strike, or a lockout. Both employer and employee I know will hesitate to yield this point but such a procedure is necessary for the proper and orderly conduct of the business on which the people so much depend, and the time has come and is now here when there should be agreement upon this point. In all cases in disagreement the parties opposed must finally yield to the decision of some other person or persons, unless the controversy is to be kept up to the point of destruction. Why not then willingly, assent to a plan whereby such an outside decision may be had in an orderly way and prevent all of the injuries which now result from the present situation?

The other point to be reached is a necessary result of the first, and that is that there should be legal inhibition of all strikes and lock-outs on public service properties. If the cause of such strikes and lock-outs is removed there is no reason remaining which will justify either a strike or a lock-out.

Let us as representatives of this great electric railway industry take our stand in favor of a just and orderly solution of these problems and we shall in so doing not only do a good thing for our employees and ourselves but also for the great public which we serve.

Three days from now I shall turn over to the new president, whom you will have then elected, the gavel which you placed in my hands one year ago at San Francisco, and this is the last time that I shall formally address you as your president. To say that I have appreciated highly the honor you conferred upon me and the confidence shown in me by choosing me as your presiding officer would be only a weak expression of my real feelings. This association represents an industry second to none in importance. The city electric railway



service and the interurban electric railway service are perhaps of more value to the people than any other single industry. It is a great honor to us, as an association, to represent this great industry, and I have felt the heavy weight of the responsibility resting upon me during the year while acting as your president.

#### LOOKING TOWARDS THE FUTURE

The future work of the association and its usefulness depend entirely upon the continued interest of its members and the efforts which they will put forth to carry forward the work. It already, in its membership, represents a very large per cent of the electric railway people of the country, but there are many companies, some large, but mostly small, which should be but are not members of the association. It is practically impossible to present the desirability of membership in the association to non-member companies otherwise than by personal conference and personal solicitation. It is for this reason that I request of you that during the coming year you will look about in your various localities, learn what companies are not members of the association and personally take it upon yourselves to see the officials of these companies, show them the benefits to be received by being members of the association and the duty that rests upon them to join with other companies in this great work. If you will all do this, the end of the next association year will see very few electric railway companies in the United States not members of the association. I also want to make the same earnest request of the manufacturing members of the association. If you do the missionary work

among your fellow manufacturing companies over the country, the number of manufacturing members can be largely and rapidly increased, and it will not be long until, with our combined membership, we shall be a much greater power in all the affairs in which we take part than we have ever been before.

I cannot take my seat without referring to the most remarkably loyal support given me by members of the association, both railway men and manufacturers. It has been a constant surprise to me and has urged me on to the best efforts I could put forth. Almost without a single exception, whenever I have called upon either a railway man or a manufacturer to assist in any part of the work, he has given me that assistance, not grudgingly but enthusiastically.

To your capable, efficient and hard working secretary and treasurer, Mr. Burritt, I desire, in this public way, to return not only my personal thanks, but the thanks of the association at large for the wonderfully able, loyal and untiring way in which he has looked after the affairs of the association. To his associates in the office at New York, one and all, I also desire to express my appreciation of their loyal and efficient work.

And now, as I close this, my last address to you, let me say that it has been a real pleasure for me to work with you for the association during the year about to close, and that I look forward to the future development of its power and efficiency with the very greatest interest. I shall carry with me during the future years of my life most happy recollections of the time when you permitted me to serve you as your president.

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“THERE is no part of our work but in some manner brings us in contact with the public. The very nature of our business is such that we constantly, at every turn, deal with some portion of the public, either directly or through their official representatives. Congress, the Interstate Commerce Commission, state legislatures and public service commissions, city and town governmental bodies, all have to do with matters regulating our business and are all to a great extent influenced by the attitude of the citizens themselves. Passengers riding on our cars, shippers of freight and express, damage claimants, trespassers on our rights-of-way, travelers on the public highways where our tracks are laid, are all parts of the great public, and with all of these we must deal. The people at large are interested in the kind of service we give and are always ready to complain of what is wrong, if even sometimes slow to praise what is right. If we are unjustly taxed, it is usually because the great body of citizens, either from want of knowledge on the subject or on account of prejudice, thinks we should be thus taxed. In case of labor trouble, the attitude of the public is of the greatest importance. Indeed, it would be difficult to point to anything connected with our business which does not bring us in some way to deal with the public. How great is the importance, therefore, of our public relations is perfectly evident to all of us, and all of us have with more or less success or failure, been using our best endeavors to smooth out whatever difficulties arise between our various companies and the public we serve.”—President Charles L. Henry.

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# Overhead Charges in Valuation Work\*

*Only charges directly associated with cost of reproducing physical and corporate elements of property are discussed. Amounts to be allowed. What charge should not be depreciated*

By PHILIP J. KEALY  
President Kansas City (Mo.) Railways



THERE are many ways of determining the value of public utility companies, and irrespective of how much weight it may have been given in the final determination, the one premise by which the value is generally judged is that of the "cost of reproduction new." An inventory or listing of the structural units of a property is comparatively easily ascertained, and the completed cost in place of the various structural units is somewhat more difficult to correctly establish. The determination of the cost to reproduce new the complete plant of a public utility corporation, however, is a matter not only difficult of finding out, but one which calls for sound business judgment and expert knowledge of the particular business in question far beyond that required in merely ascertaining the number or value of the individual structural units going to make up the completed whole.

The cost of reproduction new of public utility corporations is generally ascertained by the following three steps: (1) Obtaining bare cost of material and labor in place; (2) addition of various percentages to the items listed in (1), so as to give the total cost of the physical property, and (3) addition of those intangible elements of value which are always found in a complete going concern. There is very seldom any material difference between either side of a controversy as to the value of (1), and if the work of the engineers or accountants who prepared the various inventories be properly and correctly done, there should be practically no difference in this item. However, opinions frequently differ as to the amount of percentages to be added in (2). These are generally referred to as "overhead charges," and, considering the extent to which the cost-to-reproduce-new theory has been applied, or the broad way in which it has been used in gaging the value of public utility properties, it is indeed surprising that more definite information upon the subject is not available.

This is undoubtedly due to the fact that the old book costs of public utility corporations seldom, if ever, correctly furnish a gage of the amount of these costs and for good reasons. Most such properties represent a gradual development. The cost-to-reproduce-new theory assumes that the plant is instantaneously (or primarily so) developed. In a gradually growing business those charges which correctly formed a part of the cost-of-reproduction-new were generally absorbed in the daily operating expenses of the company. Legal expenses arising from the promotion of subsidiary companies or the expansion of the existing one; engineering charges, interest during construction, contingencies, all were usually charged directly into the cost of the work, without being distinctly or separately set out. Nor had the science of accounting reached its present stage of development. Certainly there was not then the uniformity of accounting practices that now exists, and

consequently these items, which are now recognized as proper capital charges, were largely, if not entirely, charged to operation. Moreover, at the time plants now under investigation were constructed and developed, the vital necessity of correctly determining and properly segregating such charges was not realized. Therefore, in determining the cost of reproducing a property, the appraiser is but slightly aided by existing records as to the proper amount of overhead charges, and must rely largely, if not entirely, upon his individual experience and judgment in such matters.

## SO-CALLED INTANGIBLES NOT TO BE CONSIDERED

Many authorities or authors have considered as "overhead charges" items which by others have been included in the cost of the physical elements. Thus, in defining the subject, they consider every additional allowance other than the mere cost of unskilled labor and the structural cost as an "overhead charge," i.e., they consider that the cost of installing track, poles or switchboards should properly include the expense of labor installing same. But the expense of the engineer who laid out the design, or of the lawyer who secured frontage consents permitting the installation of track or poles, is not so considered, but is referred to as an "overhead charge." Others assume the term to cover only the expense of items which have to do with the creation of the entire enterprise, as, for example, the legal expense in connection with the incorporation of the enterprise and its successful financial launching. Similarly, interest during construction, or carrying charges, are frequently so termed. Again, "overhead charges" are referred to as covering those intangible elements of value associated with every going concern, including such items as good-will or going value, cost of attaching the business, franchise value, accrued deficit, etc.

In this article, without desiring to introduce additional phrases into a subject already overrun with them, I want to clearly distinguish between the two kinds or varieties of "overhead charges": (a) Those which are directly associated with the cost of reproducing the physical and corporate elements of the property; and (b) Those which arise in producing its business. This article will confine itself to describing or defining those "overhead charges," so-called, of the first character, and there will be no discussion of those of the second character, more generally referred to as intangible values.

## HOW THE TERMS ARE DEFINED

Each of the following enumerated charges forms a definite tangible portion of the cost of every physical entity going to make up a property. In many cases they can be so allocated as to apply directly to the particular unit, in which case it is preferable that they

\*Abstract of a paper delivered before the Atlantic City Convention of the American Electric Railway Association on Oct. 11, 1916.



should be so applied. In other cases they can be applied to a class of units. Others of them, having to do more with the creation of the company itself, cannot be so applied, but wherever it can be so done it is far better in making an appraisal to weave into the individual unit costs as much of the so-called structural "overhead charges" as it is possible so to do. Many of those charges hereinafter enumerated duplicate each other, and it is not intended that all of them should apply in any one property to the various elements going to make up the completed whole.

#### 1. *Engineering and Superintendence:*

This item includes the cost of preparing working plans, specifications and contracts, supervision, progress reports, estimates for payments, together with the expense of shop inspection, tests and field engineering. No sum should be added to cover this expense where a separate allowance is made for architect's fees, on materials which are carried in stock, or upon furniture and fixtures, automobiles and miscellaneous utility equipment. It is difficult to attempt to set out a percentage which should be allowed to cover this expense, since the conditions surrounding the work largely determine it. The size of the enterprise will also have considerable effect upon the amount which should be allowed, as it is apparent that the cost of engineering and superintendence upon a small concern will be proportionately much greater than upon a large one.

Moreover, this percentage will vary greatly according to the particular enterprise in question. Illustrative of this fact, a firm of Philadelphia engineers were recently allowed 4 per cent to cover the cost of engineering and superintendence during the erection of a power house which was constructed at an approximate cost of \$2,500,000, located in a Middle Western city, while a large Eastern concern was allowed 8 per cent to cover the cost of engineering and superintendence on the value of all labor and material going into the erection of a hydroelectric power plant. In the construction of the Pennsylvania tunnels the cost of engineering amounted to 7 per cent; in the reconstruction of the Chicago traction system the engineering cost was approximately 3 per cent; in the construction of the New York subways the cost of engineering has exceeded 6 per cent, in which figure is included the expense of the Public Service Commission; and a firm of Boston engineers who have had a broad construction experience undertake engineering work on percentages ranging from 6 to 15 per cent, depending upon the amount and character of the work involved.

Thus it is apparent that the amount which should be allowed to cover engineering costs will depend almost entirely upon the local conditions surrounding the property under consideration and is a matter for the appraiser to determine at the time the valuation is made.

#### 2. *Incidentals or Contingencies (Omissions):*

This charge should cover expenses outside the contract cost, particularly extras. Such expenditures may be due to change in design, interference in construction for various causes, cost of trial operation, expense of removing unseen obstacles, delays in work, labor troubles and other kindred items, which are not easily discernible at the time of the appraisal. There should also properly be covered under this head an allowance for omissions in inventory, because, no matter how careful or how detailed the inventory may be, there is bound to creep into the same more or less error, owing to the fact that it is impossible accurately to inventory the property under consideration.

Illustrations of items which fall under this head are

numerous and familiar to all engineers engaged in construction work—unexpected fills, removal of gas and water mains, sewers, removal of drains and other obstacles, cave-ins, floods, cloudbursts and various other incidents too numerous to mention. All engineers have encountered in their work cases of this kind not foreseen at the time the work was begun, and unless an allowance for such contingencies is provided, work will be completed at a financial loss. The trouble, expense and delays experienced in the construction of the Panama Canal well illustrate this point. During a recent hearing before the valuation committee of the Interstate Commerce Commission, Mr. Holbrook, chief engineer Union Pacific Railroad, stated that after the completion of the Lucin cutoff across Great Salt Lake, he had his engineering staff estimate the cost of the work already completed and the highest estimate was 40 per cent under the actual cost.

#### 3. *Organization Expense:*

Included under this head is the cost of general office expense, securing of bids, preparing of contracts, estimates on the cost of material, inspectors, watchmen, timekeepers, paymasters, the salaries of officials and the legal expenses directly attributable to construction. This charge should also include the cost of tools used up or lost during construction (frequently a very costly item), as well as all transportation expense directly associated with construction cost, *i.e.*, carfare, livery, living expenses of men in field, railroad fare, etc. If the property is constructed by a general contractor and an allowance is made for his services, then the amount which should be allowed to cover this item will be considerably reduced, owing to the fact that some of the duties falling under this head are performed directly by the contractor's organization.

#### 4. *Architect's Fees:*

This item provides for the cost of designing, drafting and general supervision of all work incident to the construction and equipment of buildings. Where an allowance of this kind is made, no sum should be added to cover the cost of engineering, since that expense is absorbed by the allowance made to the architect. Care should be exercised, however, to see that the allowance which is made is sufficient to cover whatever expense is necessary incident to the general inspection and approval of the work. There is no uniformity in the percentage allowable to cover this item and the appraiser in determining it must be guided largely by his own experience in such matters, as well as the custom prevailing in the locality in which the property he is valuing is located.

The American Institute of Architects has established a schedule of proper minimum charges which reads as follows: "The architect's professional services consist of the necessary conferences, the preparation of the preliminary studies, working drawings, classifications, large scale and full-size detailed drawings, and of the general direction and supervision of the work, for which a minimum charge, based upon the total cost of the work complete, is 6 per cent. The total cost of the work is interpreted as the cost of all materials and labor necessary to complete the work, plus contractor's profits and expenses, as such work would be if all the materials were new and all labor fully paid at market prices current when the work was ordered. Certain of the Eastern architects are now considering a plan whereby the expense of all draftsmen and engineers shall be charged direct to the job under construction and the architect allowed a percentage on the cost of the work when completed.



### 5. *Real Estate Expense:*

This expense covers the cost incident to the selection of the site, search of title, survey, purchase and legal fees incident to the acquiring of the property, as well as the expense of juries, commissioners or arbitrators in condemnation cases, cost of removing buildings, cost of plats, abstracts, notarial fees, recording deeds and the examination of titles, cost of abutting damages and agents' commissions. The customary allowance for such expense will vary according to the character of the property under consideration. It is obvious that the cost of procuring a right-of-way through a very populous territory for an interurban line would be much greater than the cost of procuring isolated tracts of land upon which to locate carhouses or substations. The appraiser, in determining this allowance, must necessarily be guided by the local conditions surrounding the property which he is valuing. For example, most localities have real estate boards, which have certain fixed fees covering the purchase of lands. In Kansas City, Mo., the commission is 5 per cent on sales of \$3,000 or under, and upon sales of more than \$3,000 it is 5 per cent upon the first \$3,000 and 2.5 per cent upon the amount in excess of this sum.

### 6. *Purchasing and Handling (Includes Stores Expense):*

Included under this item is the expense incident to receipt, inspection, care and distribution of all materials and supplies, and such adjustments as may be necessary on account of overcharges, breakage or shortages. An allowance is made to cover this expense only on materials which are carried in stock, upon furniture and fixtures, automobiles and other miscellaneous utility equipment, and upon large units, such as power-house equipment, upon which a separate contractor's profit has not been allowed. This item may be subdivided as follows: (a) Purchasing; (b) inspection of material; (c) stores and store yard expense, and (d) loss and breakage in stores.

### 7. *General Legal and Corporate Expense:*

This includes fees and expenses incident to the incorporation of the organization, securing certificates of public necessity and convenience, cost of printing securities, payments to trustees, expenses incident to marketing securities and the general legal expenses necessary and incident thereto. It is difficult to arrive at an estimated percentage which will properly take care of these items, but it is obviously an expense bound to occur in building up every business. The corporation must be properly and safely organized; it must be put upon a sound basis for operation; reliable legal advice must be obtained to do this, as well as continually to advise the management of the company during the process of construction. It is certain that these expenses have, during the last few years, greatly increased, owing to the establishment of public service commissions or other regulatory bodies.

In the recent reorganization of a street railway system in the Middle West, this expense was well demonstrated. The property was in the hands of receivers, who negotiated a new franchise ordinance with the city, later adopted by a vote of the people. These negotiations extended over a period of practically two years, during which time the utmost publicity was given to the same, all at considerable expense. After the franchise had been adopted, the question of refunding the old obligations was taken up with the representatives of the various classes of bondholders, and a year and a half of continual negotiations ensued before a plan of reorganization was finally agreed upon by all parties thereto. This plan of reorganization was then submitted to two public service commissions for approval, and certificates of public necessity and convenience

were obtained. Afterward a decree of foreclosure and sale was ordered, the property was sold and finally new mortgages were prepared covering the securities, which were issued under the plan of reorganization. Many similar steps were taken in the reorganization of the Chicago Surface Lines and the Cleveland system, where like expenses were incurred.

### 8. *Contractor's Profit (Labor and Material):*

Included under this item is the profit of contractors and sub-contractors for supervision, direction and completion of specific construction work. Generally this percentage is applied to all units excepting those purchased complete from the manufacturer, and even on such items a contractor's profit is usually applied on the labor costs of installing the unit, provided the manufacturer's price did not include installation. No contractor's profit should be allowed on items carried in stock, on furniture and fixtures, automobiles and other miscellaneous utility equipment, if, upon all of which, there has been an allowance made to cover the cost of purchasing and handling. The term is, however, only a general one and includes the expense of purchasing, handling, managing and preparing estimates of the construction of any property. Consequently this expense will occur, no matter whether property is constructed by the company itself, or by a contractor.

### 9. *Taxes During Construction:*

This includes all real, personal and other taxes, special or otherwise, payable to the government, state, county, or city authorities, on the property during process of construction. The amount which should be allowed to cover this item can often be obtained by employing the same method of assessment as that used in the vicinity where the property is located. If company vouchers are available, the amount of taxes paid during the construction should preferably be so determined.

### 10. *Insurance During Construction:*

This insurance covers the cost of fire and casualty, public and employers's liability, tornado, workmen's compensation, flood and all other forms of insurance which are necessary adequately to protect the property during the process of construction. The amount of the fire insurance can be determined by eliminating from the appraised value of the property the non-insurable items and applying thereto the legal rates applicable to the kind of insurance involved. The cost of the other forms depends upon the particular requirements of the state where the work is performed, as well as upon the nature of the property being appraised.

### 11. *Interest During Construction (Carrying Charges):*

This includes a percentage to cover interest lost upon the money expended during the construction of the property and prior to its operation. Interest occurring on idle capital, no matter whether the same be represented by plant or cash, preparatory to putting the property in service, has been time and time again included as an element of the cost of reproduction new by public service commissions and courts. The only debatable question in regard to this is the period over which the interest allowed should extend and the rate which should be fixed. In order to determine accurately the amount of this charge, it is necessary for the appraiser to prepare a chart showing the estimated time of reproduction, separately listing the different elements which make up the property, and then, by a construction program, to ascertain the amount of money which will be required and the time when it must be available for use. After these amounts have been determined as accurately as possible, by applying the legal rate of interest for the state in which the property is located,



it is purely a matter of calculation to determine the amount which should be included in the appraisal to represent this element of value.

CARRYING CHARGES OR INTEREST DURING CONSTRUCTION  
BASED ON A THREE-YEAR PERIOD WITH INTEREST AT 6 PER CENT PER ANNUM

0 Years	1	2	3	Total Investment	Interest per Cent	Total Interest
Overhead distribution system (except services) of Kansas City Electric Light Company				\$923,213	9.0	\$83,089
Underground distribution system				793,309	9.0	71,397
Steam heat distribution system				330,962	9.0	29,786
Real estate				215,481	6.75	14,544
Buildings				409,837	6.0	24,590
Power Plant						
Equipment				1,724,341	4.5	77,595
Transformers				276,642	4.5	12,448
Lighting fixtures				109,004	4.5	4,905
Services				260,614	4.5	11,727
Meters				436,480	3.0	13,094
Total				\$5,479,887		\$343,180
Average interest					6.24	

The manner of calculating the amount of interest during construction is graphically shown in the accompanying table, which represents the manner in which interest during construction was determined in the appraisal of the Kansas City Electric Light Company. The assumption in this particular instance was that, the reproduction of the plant having been determined upon, the various distribution systems would be first constructed, their construction extending over the longest period of time. After this work was well under way, the real estate was next acquired. It was further assumed that work on the buildings would be started shortly afterwards. After the buildings had reached a certain state, the installation of the power plant equipment was commenced, the last step in the completion of the entire plant being the installation of the meters at the residences of the various customers. Interest was figured at the rate of 6 per cent for one half the time each of these various portions of the system were under construction. For instance, the interest on the overhead distribution system was figured at 9 per cent, its construction extending over a period of three years, whereas the interest on the meters was figured at but 3 per cent, it being assumed all meters could be installed in one year's time.

#### 12. Promotion Expenses:

Included under this head are the initial engineering, legal and financial expenses preparatory to the organization of the concern. By this is meant the expenses incident to preliminary surveys and studies of location, tentative completion of maps, profiles, plans, specifications and estimates; the expenses incident to the procuring of franchises, consents, permits, easements, releases and options, and the expenses incident to the preparation of prospectuses and other expenses of a similar nature. The character of the utility involved will largely determine the sum, if any, which should be allowed to cover this expense.

#### 13. Cost of Financing:

This head covers two items of expense (a) the actual discounts arising from the sale of securities; and (b) the cost of brokerage. Included in the latter is the actual commission paid to underwriters for the sale of securities, for, regardless of whether securities are sold at a large discount or at a premium, the expenses of getting them into the hands of investors must be paid for by the company issuing the securities.

At this time the question of the inclusion of bond discount is debatable, and there appears to be no fixed

rule regarding whether it should be included as an element of value in the cost of reproducing a property or should be entirely excluded. Some public service commissions have taken the first position and some the latter, but that the investor should be allowed a sufficient return upon his investment, that will offset any discount which may have been incurred in marketing the securities, is admitted by both. It has frequently been stated that the amount of bond discount represents simply an adjustment of the interest rate. The Interstate Commerce Commission has required that bond discount be written off within a period equal to the life of the bonds and the actual amount so written off be charged to interest account. This, however, does not meet the question as to the inclusion of bond discount in the original cost-of-reproduction-new, for there is a tremendous difference between writing something off which is already included as against not including it. In other words, the writing off of bond discount does not differ from the amortizing of the value of the entire plant, provided the profits are large enough to permit, but unless a direct penalty is to be imposed upon the investor and a part of the cost to him of putting his plant into condition to serve the public is to be confiscated, he must be allowed a fair return on the entire investment he has assumed, which, necessarily, includes the discount in the price at which his securities were sold.

In a late decision handed down by the Privy Council of England in the case of the National Telephone Company, Ltd., *vs.* His Majesty's Postmaster General, this question was very ably and thoroughly discussed. The question at issue here was whether there should be an allowance made covering the discount upon bonds. The court in discussing this matter said: "It has been said that it cannot be an element adding to the value of the plant. The thing desired here is the plant *in situs*, and the cost of construction, less depreciation, is the method by which the value has to be ascertained. It follows that every expense which is necessary, in order to construct, is an element to be considered and has to be considered because it is necessary in the process of construction. The thing to be transferred, say a pole, must be procured, transported and erected; each of these steps is necessary to the existence of the pole *in situs*; each of these steps costs money, and raising this money is itself an expense, and one as necessary to the existence of the pole as any of the other steps."

#### AMOUNT OF OVERHEAD TO BE ALLOWED

While there is by no means a unanimity of opinion as to what amount of "overhead charges" should be allowed, the present tendency is to include some such charge as a part of the cost of reproducing the physical property and, as the science of valuation is developed, as more thorough research is undertaken and more careful cost analysis made, the more evident is the need of such allowance and the more seeming willingness on the part of public service commissions and regulatory bodies to include it. The following percentages have at different times been used by engineers in valuation work and, subject to revision for local conditions, will adequately provide for "overhead allowances":

1.—Engineering and superintendence	5-15 per cent
2.—Incidentals or contingencies	5-20 per cent
3.—Organization expense	5-15 per cent
4.—Architect's fees	5-10 per cent
5.—Real estate expense	5-7 per cent
6.—Purchasing and handling	2 per cent
7.—General legal and corporate expense	5 per cent
8.—Contractor's profit (labor and material)	10 per cent
9.—Taxes during construction	1½ per cent
10.—Insurance during construction	½ per cent
11.—Interest during construction (per annum)	Legal rate
12.—Promotion expense	8 per cent
13.—Costs of financing	5-15 per cent

These percentages cannot be added to obtain a total overhead charge, since the first six items will apply



only to certain classes of physical property while the remaining ones apply to the enterprise as a whole. Moreover, many of the charges discussed apply only to material costs, others only to labor costs, while some in turn apply to both material and labor expense. Some of the charges also will not apply if others are used, i.e., architect's fees replace engineering expense. It might be well to reiterate at this point that the first six items above given should be so far as may be possible worked into the individual unit costs. Properly they should not be referred to as "overhead charges."

While these percentages will vary somewhat, according to the size of the property involved and the location in which the same is situated, still, as a general average, they represent charges which should be added to the cost of material and labor in place, in order to obtain the total cost of the physical property.

#### DEPRECIATING OVERHEAD CHARGES

Just as there is considerable difference of opinion as to the amount of "overhead charges" which should be allowed, so also there exists a difference as to whether or not they should be depreciated in determining the cost-to-reproduce less depreciation of public utilities. While it is clear that certain of the "overhead charges" (so-called) discussed in this paper should be depreciated, a full consideration of the subject permits no escape from the conclusion that certain others should not be depreciated. For instance, the cost of engineering and superintendence, expense of purchasing and handling, real estate expense, architect's fees, etc., can generally be allocated to the individual physical elements or classes of elements going to make up a property. When these elements are renewed or replaced certain "similar charges" will again arise in the replacement and, therefore, it follows that the "overhead charges" pertaining to or bearing upon the article replaced should be depreciated with it, since they (the "overhead charges") in this sense are depreciated.

On the other hand, "overhead charges" of the nature of legal expense incurred in initiating the enterprise, interest, insurance and taxes during construction, and costs of promotion do not depreciate and should not be depreciated. This is for the reason that most public utilities are continuous operating entities. As far as it is now within our foresight and judgment, they will be in operation and serving the public for generations to come. The enterprise will not have to be renewed. The individual physical elements going to make up the plant rendering this service will be renewed, but never again will the corporation be re-incorporated; nor will frontage consents, for example, have to be secured, nor will certificates of public necessity and convenience have to be obtained from public service commissions.

In order to simplify accounting, interest during construction should not be depreciated. Otherwise, absurd practices would arise in utility accounting, for it would then be necessary to ascribe to each individual physical element of the property its proportion of the total interest during construction charge, and as a pole, or a stretch of track, or a portion of a water main was renewed, the proportionate amount of interest during construction originally charged would be charged off for the replacement of each piece and again added on for the renewal. In short, interest during construction is generally included as a lump sum, is not allocated to individual physical elements, does not arise in renewals and betterments, and should therefore not be depreciated.

Another phase of this subject is this—for each depreciable item of plant an allowance should be made in the amount of depreciation charges annually set aside.

Therefore, if it is considered that "overhead charges," such as interest, taxes and insurance during construction, and similar charges do depreciate, it would be necessary for the management (for the utility's protection) to set aside a depreciation reserve to cover the same. Yet this would never be used, since the charges never re-occur. Consequently the operating expenses would be unnecessarily increased and the cost of service to the consumer higher, because of this practice. Therefore, in considering the depreciation of "overhead charges," it would seem most fair that those items of overhead expense directly chargeable to the physical elements should be depreciated, but that those "overhead charges" incurred in initiating the enterprise and which cannot, either conveniently or properly, be directly charged to the various physical elements, should not be depreciated. And this must be the practice, in fairness not only to the public utility corporation but to the consumer.

#### HOW OVERHEAD CHARGES HAVE BEEN APPLIED

As previously stated, courts and public service commissions by their recent decisions have recognized that "overhead charges" should properly be added to the construction costs of the property in order to determine its reproduction value. The only difference of opinion between these bodies is what should be termed "overhead charges" and what percentage should be allowed to cover the same. In the following I have selected at random various appraisals which have been made during the last ten years, which very clearly show that even as yet these questions have not been definitely decided:

##### *Wisconsin Railroad Commission:*

The engineering department of the Wisconsin Railroad Commission has almost uniformly allowed the following "overhead charges" in its valuation work:

Engineering and superintendence .....	4 per cent
Organization and legal .....	2 per cent
Interest during construction .....	4 per cent
Contingencies .....	2 per cent

Total ..... 12 per cent

##### *Chicago Elevated Railways:*

In its appraisal of the Chicago Elevated Railways, Prof. G. F. Swain added 30 per cent for "overhead charges," including engineering, legal expenses, contingencies, taxes, insurance administration, promotion, organization, interest during construction and brokerage. The valuation committee, consisting of J. J. Reynolds, John Ericson, E. C. Shankland and Geo. Weston, added 18 per cent for "overhead charges" to cover substantially the same items.

##### *Metropolitan Street Railway, Kansas City, Mo.:*

(Total value approved by Judge W. C. Hook and the Missouri Public Service Commission.)

In his appraisal of this property, Bion J. Arnold added an average of 11 per cent to cover the cost of organization, engineering and incidentals. In addition thereto, 3 per cent was allowed as carrying charges and 2 per cent for general legal and organization expense. Also 5 per cent was allowed for the costs of financing. Total "overhead allowance," 22.3775 per cent.

##### *Kansas City Electric Light Company:*

In the appraisal of this property, an average of 9.6 per cent was added to cover the cost of engineering, organization and incidentals. In addition thereto, 6 per cent was allowed as carrying charges, 1 per cent for general legal and organization expense, and 3 per cent for contingencies, which included insurance and taxes during construction. Moreover, 7.5 per cent was allowed as the costs of financing. Total "overhead allowance," 29.602 per cent.

In making an appraisal of this same property, the Missouri Public Service Commission, in addition to the general contractor's profit of 10 per cent made an overhead allowance of 6 per cent for interest during construction, 1.5 per cent for taxes, 0.5 per cent for insurance, 1 per cent for



legal, 5 per cent for engineering and 2 per cent for contingencies, making a general "overhead allowance," exclusive of an allowance for contractor's profits, of 16 per cent.

#### Chicago Surface Lines:

Appraisal made by Bion J. Arnold, M. E. Cooley and A. B. DuPont. Interest during construction, legal expense, contingencies and brokerage, 10 per cent. Organization, engineering and incidentals, 11 per cent.

Total "overhead allowance," 21.7 per cent.

#### Chicago Consolidated Traction Company:

Appraisal made by Bion J. Arnold and George Weston. Organization, engineering and incidentals, 14.6 per cent. Legal expense, interest during construction and contingencies, 5.8 per cent. Expenses incident to conducting the work, furnishing equipment and brokerage, 18 per cent. Total "overhead allowance," 38.4 per cent.

#### Cleveland Railway:

Decision by Judge Robert W. Taylor. Specific "overhead charges" to cover contingencies, uncertainties, purchasing and handling, 5.88 per cent. General "overhead charges" to cover financing, engineering, legal expense, organization, administration, insurance, superintendence, interest during construction, delays not covered by specific allowances, consents, litigation with property owners, incidentals and contingencies, 16.30 per cent. Total "overhead allowance," 22.18 per cent.

#### Puget Sound Electric Railway:

Appraisal by the Washington Railroad Commission. Total "overhead allowance," including engineering and superintendence, supervision and management, contingencies, legal and general expense and interest during construction, 19 per cent.

#### Michigan Railroad Appraisal:

Appraisal made by Prof. M. E. Cooley. Value of the physical property, exclusive of any "overhead charges" ..... \$170,291,556  
Overhead allowance ..... 32,424,706

Total .....	\$202,716,262	Per cent of structural cost
Engineering .....	\$ 5,386,772	3.2
Contingencies .....	18,428,759	10.8
Legal .....	673,349	0.4
Interest during construction .....	5,290,549	3.1
Organization .....	2,645,277	1.5
Total .....	\$32,424,706	19.0

#### Minnesota Railroad Appraisal:

Appraisal by D. C. Morgan, engineer of commission. Physical property, exclusive of "overhead charges" ..... \$345,260,419  
Overhead allowance ..... 61,264,765

Total .....	\$406,525,184	Per cent of structural cost
Engineering, superintendence and legal expense .....	\$12,133,642	3.5
Contingencies .....	17,869,703	5.2
Interest during construction .....	31,261,420	9.0
Total .....	\$61,264,765	17.7

#### Des Moines Water Company:

Value fixed by Judge Smith McPherson. Physical property, exclusive of "overhead charges" ..... \$1,452,092  
Overhead allowance ..... 233,856

Total .....	\$1,685,948
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	Amount	Per cent of structural cost
Engineering, superintendence and general legal expenses .....	\$116,928	8.0
Interest during construction .....	116,928	8.0
Total .....	\$233,856	16.0

#### New York, New Haven & Hartford Railroad:

Appraisal made by George F. Swain. Inventory reproduction cost ..... \$259,635,934  
Overhead allowance ..... 40,333,824

Total .....	\$299,969,758	Per cent inventory cost
Engineering .....	\$ 5,574,038	2.2
Contingencies .....	5,574,039	2.1
Interest and brokerage .....	23,554,678	9.0
Legal expense .....	2,475,389	1.0
General expense .....	3,155,680	1.2
Total .....	\$40,333,824	15.5

#### Coney Island & Brooklyn Railroad:

Decision by Public Service Commission of New York. Total "overhead allowance," including contractor's profit, engineering, organization and incidentals, 24.81 per cent.

#### Milwaukee Electric Railway & Light Company:

Appraisal by Wisconsin Railroad Commission.	Per cent
Contingencies and omissions .....	3
Interest .....	3
Engineering .....	4
Organization and legal .....	2
Total overhead allowance .....	12

#### Coney Island & Brooklyn Railroad:

Appraisal by Frank R. Ford.	Amount	Per cent of physical cost
Physical property .....	\$6,558,447	...
Promotion and legal expense .....	421,200	6.42
Property owners' consents .....	278,500	4.25
Organization expense .....	195,640	2.98
Incidentals .....	276,460	4.22
Engineering expense .....	230,792	3.52
Contractor's profit .....	527,514	8.04
Interest and taxes .....	561,345	8.56
Total .....	\$9,049,898	37.99

#### Detroit United Railway (City Lines):

Appraisal by Robert B. Rifenberick.	Amount	Per cent of structural cost
Material and labor .....	\$18,663,536	...
Incidentals .....	1,050,294	5.62
Contractor's profits .....	1,148,777	6.16
Liability insurance .....	114,264	.61
Builder's risk .....	17,243	.09
Architect's fees .....	62,551	.34
Cost of acquiring land .....	79,463	.43
Engineering .....	720,955	3.86
Organization .....	1,092,122	5.85
Carrying charges .....	2,064,111	11.06
Financing .....	1,999,894	10.72
Total .....	\$27,013,210	44.74



# Training Men for Supervisory and Executive Positions\*

*Minor officials need to be trained along certain definite lines, under guidance of executive operating official. Men should be raised from ranks for supervisory work. One-man organization discourages original thinking*

By L. C. BRADLEY

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THE purpose of this paper is to discuss, in a general way, the training of employees who have as a part of their work the observation, supervision or control of other employees in the transportation department. The importance of proper training of this class of employees is very great, as upon it, to a large extent, depends the efficient operation of the road. When the trainmen leave the school of instruction and become regular motormen and conductors on the cars, they are then dependent wholly for further development, their attitude toward the company, satisfaction in their work, upon this class of employees. To supplement the training that they, individually, have received, it is important that they be placed under men whose ideas and methods have been developed with similar care.

## SELECTING MEN FOR SUPERVISORY AND EXECUTIVE WORK

The selection of men for supervisory and executive positions should be made from the ranks wherever it is possible. The main reason for this is that it creates an incentive for good service on the part of the subordinate employees. To make this a sufficient incentive, the selection should be based upon good service. The most competent employee, all qualifications considered, should be selected to fill the vacancy in the supervisory position. Selections should be made from the ranks for the additional purpose of getting the value of knowledge already gained as to the local methods of operation.

It has been the general rule in street railway operation, in promoting employees from the ranks to supervisory positions, to give very great weight in selection to the quality vaguely known as executive ability. The exact definition of executive ability, from the standpoint of the average person who has the right of selection, is sometimes of a very indefinite nature. The old idea that executive ability is sometimes born in a man and cannot be created or developed, is a fallacy. The average hero-worshipping biography, intended for school-boy consumption, states that the subject of the work was a leader from boyhood. As a matter of fact a great number of our boyhood leaders have sunk away somewhere into insignificant positions, and many positions which call for the direction of numbers of men are filled by those who never evinced a single symptom of leadership in the playground or school yard sense.

In the street railway business, more than in almost any other, the old idea has survived that the inspector or supervisor must be a boss, and that being a boss, he must have the heavy jaw or undershot chin that proclaim his boss-ship. In almost every other business, however, it has been demonstrated that the ideal executive is the man with the keen observation, alert mind and intelligence enough to study and learn the ways in which a man can gain and hold the loyalty, respect

and confidence of those over whom he has supervision and who seek direction from him.

In selecting men from the ranks, therefore, for supervisory positions, consideration must be given not only to competent service, loyalty and appearance, but also to keen observation and that quality of intelligence which might be denominated "teachableness"—that quality by which a man can learn not only from the direct instruction of others but from observation and experience.

## TRAINING TRANSPORTATION OFFICIALS

The Transportation & Traffic Association committee on the training of transportation employees in its report for 1912 recommended that supervisory officials be trained along certain lines, which I have taken the liberty of rearranging as follows: Handling of subordinates; details of operation; comprehensive control within the limits of designated authority; demonstrative methods; economic innovations, and company policy. Each of these will be taken up in turn.

### Handling of Subordinates:

The proper handling of subordinates is, of course, the "crux" of the official's ability. If he is incapable of handling subordinates, he is not a proper official. It is in this phase that the need of training is greatest and the need is least served. We would not think of making a man an inspector who had never run a car or who did not know something about the objects or ideals of a street railway organization, but we do take a man on the strength of his individual work and attainments and give him a position of directing others, although he may have had no previous experience in this line. The direction of subordinates is something that can be taught just as easily as the mechanical operation of a car, and much wear and tear on the machinery of an organization can be saved by taking the minor official in hand at the proper time and systematically and carefully pointing out the way by which he can properly direct his subordinates.

Up to the time that one is given a supervisory or executive position, his whole progress has depended upon the work which he, individually, can accomplish. What is more natural, then, than for him to continue to strive to show how much work he, individually, does after being given the supervisory position. One of the first things that should be inculcated in him is that he is not to be judged by the work which he, individually, does, but by the results secured from the work of his subordinates. The first quality, therefore to be developed in the supervisory official is self-effacement—in other words, the losing of his identity in the results to be accomplished, the gaining of loyalty and respect from his subordinates by seeing that they are given the credit for results secured and the minimizing of

\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation & Traffic Association on Oct. 10, 1916.



personal achievement to the usefulness of the official's organization.

The second quality to be inculcated in the minor official is that of patience. For an individual working with a piece of machinery, impatience with slow results is sometimes a worthy quality, but men are different from machinery and in order to secure satisfactory results from them it is not only necessary to have an ideal to reach, but the patience to wait for the accomplishment of that ideal. Men are not machines. They learn by mistakes. They can be made to do better work through the suggestive knowledge that they have made mistakes, and that they are too intelligent to repeat them. Individual handling of men means patience, and this is the essential quality of the executive official. The firmly closed lips of the average great executive do not denote obstinacy or pugnaciousness, but are the result of patient waiting, year after year, for the results previously visualized in the mind. The impatient executive is avoided as much as possible by all high-minded employees; while the man who is patient is lovable and wins the hearts of his fellow employees. Not all patience is a virtue, however, and exaggerated patience may easily become a vice.

The third quality to be inculcated in the supervisory official is sympathy, not in a sentimental sense, but in the sense of a genuine understanding of the men whose efforts he directs and a sincere intention to aid in the problems and the working out of his ideals. One cannot be a true executive who does not possess this sympathetic understanding and aim. If a man is working under the direction of another who understands him and his troubles and who seeks to aid and advance him in every way possible, then his work becomes a part of his life, and a desire to work properly and successfully becomes as strong as the desire to live properly and successfully. This sympathy frequently gives understanding as to the cause of breaches of discipline, and through this understanding of causes, the ability to prevent them.

The fourth quality to be developed is appreciation. A man cannot be a true executive without being grateful for efficient work on the part of his subordinates, and he also should have the desire and ability tactfully but certainly to make the employee aware of the fact that his efforts are appreciated and in due time will be rewarded. The employee should be made to feel that his appreciation is impartial and just; that his good work is not to be used for the glory or advancement of his superior, but that the credit goes to the man who produces the good work. The appreciation should not be captious or uncertain, depending upon the whim or feeling of the executive or supervisor. It should not be too lavish, for compliments, of themselves, indiscriminately bestowed, lose their savor. Nor should it be too sparing, because the isolated compliment does not atone for months of apparent indifference.

#### (2) *Details of Operation*

A comprehensive understanding of the details of operation is, of course, necessary to any official. This understanding must be an intelligent one that comprehends not only all facts and methods in regard to the system's operation, but the reasons for these and also the reasons why other methods are not used instead. This complete understanding can be reached, not only by interested observation of the road upon which the official is employed, but by the study and observation of street railway methods and history in general, this study being facilitated by the reading of journals devoted to street railway business; by trips of inspection to other street railway systems and by attendance upon state and national conventions.

In this connection I cannot but deplore the tendency in many street railway companies of allowing only what might be termed the higher officials to attend these conventions, thus depriving the rank and file of the executive and supervisory officials of the benefits of hearing the papers and discussions on timely topics at these conventions. The more the supervisory and executive employee knows about the details and methods of operation of street railways in general, so much the more efficient does he become in the scope of his duty. Consequently, it becomes the duty of the manager to make access to wider knowledge for this class of employees easy and attractive, and in no manner is this access made easier than by attending these conventions.

#### (3) *Comprehensive Control within the Limits of Designated Authority*

It is equally important in the satisfactory development of the minor official that, within the limits of his designated authority, his control be comprehensive; that he feel this responsibility and not be afraid to exercise his authority. This is directly the antithesis of the practice pursued on those roads in which there is a general manager or a general superintendent who feels that no single detail can be attended to without his personal supervision. Such a manager or superintendent may, by unusual ability, have a well-managed railroad, but this method stifles the development of the unfortunate individuals who are supposed to be holding minor official positions on that road.

Such an organization, depending as it does upon an unusual genius, must go to pieces when that genius is removed from such sphere of activity. The road then is disorganized and must work like a wrecked piece of machinery until its owners can discover some other rare genius to take the place of the one removed, or else submit to the slow and tedious process of building up an organization, founded upon common-sense and modern systematic methods, in which the development of the official force of the road is contemporaneous with and equivalent to the demands made upon the ability of such force.

The machinery of a well-balanced organization is not damaged, or even slowed down, by the removal of any member, no matter how important his position. It is a rational scheme, composed of intelligent human beings, co-operating toward a common end and not depending upon the unusual natural ability or talents of any one member. The one-man organization can never be as efficient as that organization in which all the officials, within the scope of their designated authority, have more or less of a free rein.

"The Message to Garcia" would never have been delivered if the sender thereof had outlined the full course of the journey from start to finish and had prescribed the methods by which the bearer should meet each obstacle as it arose. The message was delivered because it was put up to the individual to deliver and he did so. The same reasoning applies to the work of the minor official. He can never be developed unless the full responsibility for the results to be secured by this work is placed upon him and it is left to him, through his own individual attainments, training and judgment, to carry on the work for which he has been selected.

#### (4) *Demonstrative Methods*

Familiarity with the details of operation of the road on which an official is employed, as well as an intelligent conception of the methods and advances made in the street railway industry as a whole, will inevitably, in the natural evolution of ideas, place the minor official in such mental condition that he will be a continual



schoolmaster to the men under his control or in his department. The old saying that "Out of the fullness of the heart the mouth speaketh" could be well paraphrased to mean that "Out of the fullness of the mind comes the best teaching."

#### (5) *Economic Innovations*

Similarly, from a sound understanding of conditions as they exist, comes the best suggestions for improvements in conditions. Here again is a field where a great many mistakes have been made by managements in the past in discouraging suggestions for improvements or betterments on the part of minor officials. Of course, it should be well grounded in the mind of the executive and supervisory force that before suggestions are made as to changes in methods or equipment, the advantages and disadvantages probably resulting from such change should be well considered, and that the suggested improvement should be advanced only after careful consideration, and should be accompanied by intelligent reasons for adoption. Ideas, even of the most revolutionary description, should not be discouraged. On the contrary, original thinking should be encouraged, but such thinking should be trained and developed along lines that will tend to make such thought productive. The greatest handicap of the one-man organization is the fact that original ideas are but rarely developed. The one-man executive is too busy to have original ideas of his own, or, if he has such ideas, he has not the time to study them out carefully, while his desire to keep control in his own hands discourages original thinking on the part of others.

#### (6) *Company Policy*

By no means least in importance is the proper training of supervisory and executive employees along lines of public relations. Their sphere of usefulness, under proper direction, is unlimited. Moreover the training is imperative, if we would take full advantage of our available resources. The Code of Principles sets forth clearly the responsibility of public utilities and commits the member companies to a high standard of business obligation. Whether the spirit behind the principles has been universally adopted I do not know, but assuredly if street railways under private ownership and operation are to carry out their functions properly, the principles enunciated must be disseminated among the people.

I sometimes fear, however, that the doctrine of the code appeals only to that class of our citizenship whose intelligence enables them to comprehend the intricate details of financing and management. No one questions the soundness of the principles, but I am one who believes the work of education or co-operation should start with our own employees. It is safe to say that a vast majority of the 300,000 employees engaged in street railway service in this country (a formidable army for disseminating correct information), have no intelligent conception of the aims and purposes of the companies for which they work.

A notable example of the policy of informing the supervisory and executive employees as well as subordinate employees on all matters pertaining to public relations is that of Mr. Lillienthal of San Francisco. Recent events have fully demonstrated the wisdom of his course.

In one of the larger cities of this country a franchise election was held, and I am reliably informed that a substantial majority of the subordinate officials and employees were wholly uninformed as to the merits of the controversy. These men, from their very attitude desired to render service, but their statements in reference to the matter were pathetic in the extreme. Need-

less to say, the election was unfavorable to the company and failure to enlist the active interest of the employees was unquestionably one of the contributing factors. Loyalty and enthusiasm, rightly directed, will surmount many difficulties.

If the policy of any company is understood and believed in by the executive and supervisory force, they will in turn imbue the individual employees with an understanding and feeling of such policy. In this case, then, the company will cease to be a cold, unfeeling corporation, with purely paper policies, and become an aggregation of sympathetic, human beings, actually living and working out this policy day by day.

Motormen and conductors, learning the principles of the air brake and controller in schools of instruction, may learn how to operate a street car and become familiar with schedules, but the true learning of the expression of the company toward the public must come after they have begun to work upon the cars, through their association with each other and with the individuals who immediately direct their activities. It becomes, therefore, a matter of prime necessity that the inspector, the instructor, the supervisor, the division superintendent and similar officials should understand, appreciate and impart this spirit of the organization.

#### METHODS OF TRAINING MINOR OFFICIALS

Manifestly, in all except the very largest of street railway organizations, it would be impracticable to have a formal school for a supervisory and executive employee. It is not clear that in any case such formal school would be desirable for this class of employees. In my opinion, this training must be systematically imparted by the executive operating official of the individual company, whether this official be termed manager, general superintendent or by other title. This training must be kept in mind in all the relationship of such executive to the minor official, and should be supplemented by regular, stated meetings of this class of employees, at which there should be discussion and instruction on the training subjects previously enumerated.

These meetings should not be held so often as to partake of the nature of a schoolroom, but should be held often enough for the impressions formed from meeting to meeting to overlap, so that the minor official is continually conscious of the principles set forth at these meetings. It would be the wisest plan to have these meetings called for other purposes than that of instruction. For instance, a regular series of accident meetings, to discuss accidents that have occurred and methods of eliminating them; safety-first meetings, called at stated times for the purpose of minimizing accidents; or company luncheons, at which some paper is read or a talk made to assist the minor official along the lines here suggested. I cannot emphasize too strongly the need of social or semi-social gatherings as a splendid medium for humanizing the official force. It is essential if harmony, team work and the fullest development is to be obtained.

While I have suggested that this work of education should be carried on by the executive operating official, it is by no means necessary that such official always give these lectures or discussions himself. The reading of articles by other persons, touching these subjects; the discussion of these subjects by the members of the supervisory force themselves, or the discussions of such subjects as are touched upon from time to time in trade publications, would all be of use and effect.

This direct training of the minor official, however, must be supplemented by observation and encouragement of the minor official in the handling of his individual problems as they may arise, such observation



being always in the form of sympathetic interest and not a solution of his problems for him. This training should also be supplemented by a broadening of the minor official's knowledge and training, through the medium of the street railway publications and of the state and national conventions. The members of this class of employees should be encouraged with every chance to prepare a paper or to participate in the discussion of subjects at these conventions. His contribution should be made the subject of comment and discussion by the entire official family of the company. It could well be distributed among all the employees of the company, for the work or attainments of one member of the company might well be considered the property and pride of the whole company.

In conclusion, no organization should lose sight of the fact that its success and prosperity is due to the work of its combined forces, and no man in its employ who has risen in any degree whatsoever above the ranks

should be too unimportant to have his growth and development followed with careful and individual concern. The employee may not know that his natural talent is being studied; that his character is being developed; that his training is being systematically carried on by advice, counsel, or by direction. He only knows that as he becomes qualified the position of greater responsibility awaits him; that as more responsibilities fall upon him, greater avenues will open for him to become acquainted with the manner in which to meet such responsibilities; that as the time arrives when he has exhausted the possibilities of the line of work in which he is engaged, he may many times, without previous request, be transferred to other work, opening up possibilities for a new development. He further knows that so long as he is ambitious to advance, he need not worry about his position, and thus he has that peace of mind which is the best environment for the growth of ideas.

## The Engineering Development of the Electric Railway\*

*Beginning with the researches of Prof. Joseph Henry, the author traces the history of electric traction in this country and abroad, and tells in detail of the Richmond electrification in which his company lost \$75,000 on a \$110,000 contract*

By FRANK J. SPRAGUE

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**S**PEAKING generally, the whole electrical industry, so far as it is dependent upon dynamo electric machinery, may be said primarily and largely to rest upon the researches of the famous American scientist, Joseph Henry. The first real suggestion of the electric railway in the United States seems to have come from a Vermont blacksmith, Thomas Davenport, who is reported to have operated a toy motor on a small railway in 1834. In 1838 Robert Davidson, a Scotchman from Aberdeen, began the construction of a locomotive equipped with a motor. His engine attained the respectable speed of 4 m.p.h. in a trial conducted on the Edinburgh-Glasgow Railroad. Among other pioneers were Prof. Moses G. Farmer and Professor Page, the latter with the government aid constructing a small primary battery car which reached 19 m.p.h. on a road between Washington and Bladenburg.

The above and other experiments were doomed to commercial failure not alone because the source of power was the primary battery, but because the motors were of crude design and construction, based upon the attraction of keepers or solenoids. Between 1845 and 1870 the self-exciting dynamo was developed and between 1867 and 1872 its reversibility was discovered. However, in the quarter century ending in 1875 there appeared to be a complete cessation of electric railway experiments.

### EARLY COMMERCIAL WORK

Among the European concerns engaged in building dynamos for lighting and other purposes that of Siemens was the most prominent. In 1879 this firm showed at the Berlin Exposition a small car operated from a third-rail with track return. Soon after among other inventors Stephen D. Field and Thomas A. Edison be-

gan electric railway experiments. Priority of invention was awarded to Field, who early

contemplated the operation of street cars in San Francisco. In 1880 Edison built a small road at his Menlo Park laboratory, and in the following year Siemens and Halske established a 1½-mile, one-car line at Lichterfelde, near Berlin. The latter may be considered the first commercial electric railroad. This equipment was followed by one at the Paris Exposition where overhead distribution was used for the first time.

In 1881 I constructed at the torpedo station, Newport, a dynamo which had two armature circuits and a plug switch by means of which series-parallel combinations could be made. Tests of the machine under these conditions were made, first as a dynamo and later as a motor. Some years later there was combined with the simple series-parallel control the variation of current strength by varying a resistance in the circuits of the motors. The validity of the patent on this invention was not established for some time, and in the end an adjudication of the claims of rival inventors was avoided probably by the combination of the contending interests.

In the early eighties other inventors were becoming active, among them Dr. Finney of Pittsburgh, Professors Ayrton and Perry of England, Dr. Fleeming Jenkin of Scotland. Siemens and Halske constructed an experimental road near Meron, in the Tyrol, to demonstrate the possibilities of electric traction for the St. Gothard tunnel, and also small lines at Frankfurt and Molding.

In 1882, while connected with the United States Navy, I procured an assignment to the *Lancaster*, sailing for the Mediterranean, then received leave from my ship, and subsequently obtained orders to the British Elec-

\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Association on Oct. 12, 1916.



trical Exposition at Syderham. While riding on the underground road I conceived an ideal of electric propulsion based upon the use of the tracks as one conductor and for the other a system of rigid overhead conductors all in one plane. Soon after, resigning from the Navy, I returned to the United States and, after spending nearly a year with Mr. Edison, formed the Sprague Electric Railway & Motor Company. At the same time the Edison and Field interests combined to form the Electric Railway Company of the United States, and operated a small locomotive, the "Judge," which ran around the gallery of a building at the Chicago Railway Exhibition. In the winter of 1882-1883 a Belgian woodworker, Charles J. Van Depoele, conducted experiments in or near his works in Chicago with a small car, the current being taken from a wire laid in a trough. This was exhibited at the Chicago Industrial Exhibition. He is also reported to have tried an experiment in which he used an overhead wire with an underrunning contact wheel, and this formed the basis of a hard-fought interference between him and myself.

Among the active workers of this period was Leo Daft, who made his first experiments at his company's works in Greenville, N. J., in 1883. In November of that year, he ran a locomotive, the "Ampere," on the Saratoga & Mount McGregor Railway, where it pulled a full-sized car. There was considerable activity during the following two years in Great Britain and in this country. For example, in August, 1885, Messrs. Bentley and Knight, who had conducted some experiments in the yards of the Brush Electric Company at Cleveland in the previous autumn, installed a conduit system on the tracks of the East Cleveland Railway. This was operated at intervals during the winter and then abandoned. John C. Henry also installed and operated in Kansas City a railway supplied with two overhead conductors on each of which traveled a small trolley. He later, elsewhere, used the rail return.

In the early part of 1885 Prof. Sydney Short of Denver began a series of experiments on a series system, a constant current being sent through all the motors of the line, but later adopted the multiple distribution. He also attempted the use of gearless motors, but soon reverted to the geared type. In August of this year Daft began his work on the Hampden branch of the Baltimore Union Passenger Railway, which, I believe, was the first regularly operated electric road in this country. Encouraged by his success, he undertook the equipment of a 2-mile section on the Ninth Avenue Elevated Railroad in New York. Here, during the latter part of 1885 he operated a locomotive called the "Benjamin Franklin," which, pulling a train of cars, made several trips. A speed of 25 m.p.h. was sometimes obtained, and on one test an 8-car train was pulled up a grade of nearly 2 per cent at a 7-mile gait. During this and the following year Van Depoele installed a number of small roads.

#### THE RICHMOND ROAD AND PRECEDING EXPERIMENTS

After separating from Mr. Edison in 1884 I formed the company already mentioned, which had a nominal capital of \$100,000, and from which I received a salary of \$2,500. At first the stationary motor business was developed, but my mind soon reverted to railway problems.

In a paper read before the Society of Arts in Boston in 1885 a novel scheme of operation for the Manhattan system was outlined involving the now universally used "wheelbarrow" system of motor suspension. The opportunity later arose to try the experiment in which at first Jay Gould, one of the principal owners of the

Manhattan Elevated, was interested. The experiments, which were first made on a short track between the walls of a sugar refinery, were later transferred to the Thirty-fourth Street branch of the railway. They were witnessed in May, 1886, by a large number of officials of the Elevated and other enterprises, among these officials being Cyrus W. Field and the Duke of Sutherland.

After this test I disposed of a sixth of my interest in the company for \$50,000, a very acceptable help in a time of need. The experiments were continued, but the stockholders and directors of the road took no further interest in them, and I turned my attention to trolley problems.

A New York politician, who had secured a franchise for an electric railway in Richmond, Va., had associated with him in the enterprise a banker and a merchant in railway materials. A short time before my company had taken a small contract for the Union Passenger Railway at St. Joseph, Mo., and secured the one for the Richmond Union Passenger Railway in May, 1887. The latter called for the completion in ninety days of the equipment of a road having about twelve miles of track, at that time unladen, and with the route only provisionally determined, the construction of a 375 hp. power plant, and the furnishing of forty cars with eighty motors and all appurtenances necessary for their operation. Thirty cars were to be operated at one time, and grades up to 8 per cent were to be mounted. Finally the payment was to be \$110,000 if satisfactory.

My immediate assistants on the Richmond work were Lieut. Oscar T. Crosby, a West Point graduate, and Ensign S. Dana Greene, from the Naval Academy. On account of an attack of typhoid fever I was, at a critical period, absent from work nine weeks, being almost the entire burden on my associates. When the contract was undertaken we had only a blueprint of a machine and some rough experimental apparatus.

After overcoming difficulties one by one, we began experimental runs in November, 1887, but various troubles had brought us to the end of the following January when it had become vital to begin regular operation. At this time we prepared to open the line with about ten cars. As a preliminary to regular operation we spent a day carrying loads of children, and about February 2, 1888, in a drizzling rain, we opened the line for regular service. The day was one of disappointments, as difficulties in operating the equipment developed. Troubles with gears, commutators, brushes, etc., had to be overcome. We managed, however, to keep the cars moving and gradually our greater difficulties began to lessen, even if new ones cropped up. By May 4 there were thirty cars in operation, and finally forty cars.

A most important experiment of banking the cars occurred one night on the occasion of the visit of President Henry M. Whitney and a number of directors of the West End Railway of Boston, Mass. General Manager Longstreet of the railway was a strong advocate of cable operation and had doubted the possibility of handling the cars electrically when badly bunched. On this occasion twenty-two motormen started their cars at the extreme end of a section of the line designed for four. This test was conclusive and the fate of the cable in Boston was settled. Richmond's troubles were buried under an immediate financial loss to my company of \$75,000, fully compensated for in the subsequent unparalleled growth of a great industry. Among the characteristic features established by this installation were: the main and working conductors and feeders, with bonded rails and earth return; the universal movement, reversible trolley in the center of a car; double-ended control; axle-suspended motors; series parallel group-



ing; variation of field resistance; fixed end-contact brushes, and lightning arresters.

The final success of the Richmond road, the rapid equipment of a number of others, and especially the adoption of electricity on the West End road of Boston by Mr. Whitney, whose first installation was part conduit and part trolley, and to whom must be awarded the credit for initiating the modern consolidations of street railways, were followed by a period of extraordinary activity in commercial and technical development in which for a time the Sprague and Thomson-Houston companies were principal competitors.

The progress made in the United States soon commanded the attention of the old world, and work was begun along the same lines in Italy, where I installed the first road, the Florence-Fiesole, in 1889. The first road in Germany was installed at Halle, by our agents, the Allgemeine Elektrizitäts Gesellschaft, but it was not until a number of years later that there was any general adoption of the electric railway in the more conservative countries.

Meanwhile the Sprague Electric Railway & Motor Company was absorbed in 1890 by the Edison General Electric Company, and soon after I severed my connection with it and took up the development of high-speed passenger, freight and automatic house electric elevators in opposition to the hydraulic trust. The Edison Company was later combined with the Thomson-Houston Company and others in the General Electric Company. The Westinghouse Company had meanwhile actively entered the field, and for a number of years these great companies have done the larger part of the electric railway work in this country and abroad. The record of the succeeding years is largely that of an extraordinary industrial development, with continuous improvement in the service rendered and increase in the size of apparatus.

#### HEAVIER TRACTION

Soon after the use of electricity for single cars had proved successful, heavier operations were naturally attempted, and as early as November, 1890, a line on the South London Road, which was originally designed for cable, was opened, the trains being pulled by electric locomotives equipped with a pair of gearless motors having armatures mounted on the axles of the drivers. Meanwhile, I was keenly interested in the rapid-transit problem, and urgently advocated a four-track underground electric railway for New York. I also offered, under heavy forfeiture, to install on the elevated road a train to be operated by a locomotive car, also one to be operated by motors under the cars under a pilot control, and to make an express speed of 40 m.p.h.

Two years later the Liverpool overhead railway was put in operation. Here the trains were composed of two-car units, each car having one motor, the two being operated by hand control. In the spring of the same year, 1893, the Intramural Railway was constructed at the World's Fair, Chicago, the equipment being supplied by the General Electric Company. Motor cars with hand control were used to pull trail cars and a third-rail supply with track return was adopted. In 1895 the Metropolitan West Side Elevated Railroad in that city was equipped on the same general plan. In the following year the Nantasket Beach Road, a branch of the New York & New Haven Railroad, was put in operation, and in September the Lake Street Elevated of Chicago followed. Soon afterward electric service was instituted on the Brooklyn Bridge, motor cars being used to handle the trains at first at the terminals, and later across the bridge.

There were few attempts, however, to replace steam operation on regular roads, and only occasionally were

electric locomotives used and then only for some special reason.

These various equipments, all following steam precedents, seemed a pitiful falling short of the possibilities of electric train operation. Upon taking up the development of electric elevators I adopted distant control of the main motor-controller from a master switch. Pondering over the elevated railway train problem one day, the thought suddenly flashed upon me: Why not apply the same principle to train operation? That is, make a train unit by the combination of a number of individual cars, each complete in all respects, and provide for operating all the controllers simultaneously through a train line from the master switch on any car. Here was a way to give a train of any length all the characteristics of a single car, with every facility of operation demanded by the most exacting conditions of service and capacity.

After two abortive attempts to get the privilege to demonstrate the advantages of the system at my own expense on the Manhattan road in New York, an unexpected opportunity suddenly arose in the spring of 1897, when I was requested to act as the consulting engineer of the South Side Elevated Railway at Chicago.

I hastily drew up a report, the main feature of which was an argument in favor of the abandonment of locomotive cars and the adoption of individual equipment under common control—in short, the multiple-unit system. As an earnest of my confidence I supplemented the report by an offer to personally undertake the equipment of the general plan outlined, which set with the indorsement of the engineers. This was followed by a visit to Chicago, but the contract was not concluded until after I left for Europe, and then only after a very bitter fight with various companies and under most onerous conditions, supplemented by a \$100,000 bond for performance.

On July 16, 1897, two cars were put into operation on the tracks of the General Electric Company at Schenectady, and on the 26th, the half-century anniversary of Professor Farmer's test of a model electric railway at Dover, my ten-year-old son operated a six-car train in the presence of the officers and engineers of the South Side Elevated Road at Schenectady. In November a test train of five cars was put in operation in Chicago. Three months later locomotives had been entirely abandoned, and the whole 120 cars were in operation, the local work being largely supervised by my assistant, Frank H. Shepard.

The controllers for the original Chicago equipment were of the ordinary street car type, operated by pilot motors automatically retarded by any excess of current in the motors during acceleration. The train line contained three speed and two direction controlling wires terminating in couplers at each end of the car. The disposition of the control wires and their connection to the master switches was such that whatever the number, sequence or end relation of the cars there was never any change in the connection of the speed circuits, but when the cars were reversed the direction controlling circuits were automatically reversed. So, also, whatever the grouping of cars, like movement of the master switch with reference to the facing of the track produced like relative direction of movement. These principles are fundamental, whatever the changes of physical details.

As an alternative construction the Westinghouse Company first used a step-by-step pneumatic motor to operate the controller, and later, on account of the increase of duty, both the General Electric, which finally absorbed the Sprague Company, and the Westinghouse Company replaced the single cylinder form of controller



by a combination of individual contactors each under a magnetic blowout.

#### STEAM RAILROAD ELECTRIFICATION

Following a serious accident in the yard tunnel of New York Central road some years ago, the first great step in main line electrification was taken when electricity was adopted for operation at and for some distance from the main New York terminal. Up to that time all motors used for railway purposes maintained a fixed relation between the armature and the field, but when this project was finally taken up a plan for a new type of locomotive was adopted by the General Electric Company, originally proposed by Mr. Batchelder. This called for the use of bi-polar motors, in which the fields of the motors were carried in a horizontal plane, were supported by, and made an integral part of, the locomotive frame and were carried above the suspension springs.

The armatures were rigidly secured to the axles and the fields with flattened pole pieces and a comparatively large air gap, and were free to move up and down relative to the armatures. These locomotives were the first to be equipped with the multiple-unit control so that two or more could be operated together. On this equipment was first developed the Wilgus and Sprague standard under-contact third rail.

Even in the early days of electric railroading it soon became apparent that at the prevailing electric pressures commonly used, from 450 to 600 volts, the field of operation would be restricted by the large investment required for copper, not, of course, within ordinary city limits, but as soon as the distance became considerable. I was, therefore, always an advocate of improvements looking to the use of higher potentials, and especially urged the raising of direct current potential to its practical limit. For a long time this seemed to be impracticable.

Meanwhile the system of polyphase alternating current transmission and conversion to direct current at substations through the intermediary of step-down transformers and rotary converters or motor generators had been developed, and many engineers became the ardent advocates of the abandonment of all consideration of the use of direct current for interurban and trunk line operation and urged the adoption for this purpose of single-phase alternating current operated at high potential on the trolley wire, speed control to be attained by the use of a step-down transformer.

The great difference of opinion among engineers and manufacturers early gave rise to bitter controversies. During a long period of doubt among many as to the results of single-phase operation, my attention was called to the developments which were taking place in variable-speed motors for ordinary industrial purposes by making use of my old inter-pole winding, localized to small extra poles carried between the main field of the motors, and in consequence I urged a test of this practice on railway motors. The first results were so remarkable that I instantly saw the possibilities of a great increase in the potential which could be used in direct-current operation. On account of certain inherent defects in the single-phase motor it also seemed likely that it would gradually be abandoned, and since its sole claim for use had been based upon the economy of installation and transmission, direct current would maintain a supremacy not alone on urban and interurban roads, but also in trunk line operation.

The experience of the past few years seems to have demonstrated the soundness of these conclusions, for while the New Haven system has been, necessarily, maintained and extended, most of the other single-phase

installations in the country have been abandoned, while, on the other hand, some of the most difficult and extended freight lines, deemed by many engineers barred to direct-current operation, have now adopted direct current at from 2500 to 3000 volts working potential, as illustrated by the Butte, Anaconda & Pacific Railway and the 440-mile section of the Chicago, Milwaukee & St. Paul Railway.

There are, of course, alternative methods which are still in use, as, for example, the polyphase system used on the Great Northern Railway, important installations of which have been made in Switzerland. One of the most ambitious attempts of this character was that by two German companies, thirteen years ago, on the Zossen military line, where was made the highest record for speed of a car carrying passengers, about 126 m.p.h., the current being collected at 10,000 volts from three overhead wires by sliding contacts. The multiplicity of conductors, however, distinctly militates against this general system as a solution of the larger railway problem, despite the high ratio of motive power to weight and the easy use of the motor for braking by regeneration, quite independently of other limitations affecting trunk line transportation in general.

Additional methods of using single-phase alternating currents on the working conductor have been proposed and put into practice, but these eliminate the single phase motors entirely. Among them is the introduction on a locomotive of apparatus for changing the energy of the single-phase current into two-phase current to be used in a polyphase motor, as on the Norfolk & Western Railway. Conversion into a pulsating direct current by the use of a mercury rectifier carried on the locomotive has been tried out quite extensively in experimental equipments, and also the use of mercury rectifiers operated from polyphase currents at substations, in both cases in connection with direct-current motors.

Following the general plans suggested by me in a study of electrification for the Sacramento Division of the Southern Pacific Company a number of years ago, the Chicago, Milwaukee & St. Paul locomotives use, instead of the ordinary series motors, independent excitation of the field magnets from motor generators, which makes it possible not only to use the motors for brakes in a circuit closed around the armatures when disconnected from the line, but also to regenerate current on down grades while connected to the line.

#### THE FUTURE

Despite the enormous advances made and the results accomplished in electric railway development it would be folly for the electrical engineer to assume that we have arrived at the limit of invention or improvements. The urban and interurban fields, with the constant linking up of smaller systems into more extended systems, goes on apace, but the trunk-line systems are still largely steam operated. It is possible, and quite probable, that irrespective of any improvements which may develop or any new inventions which may appear the financial question will continue, as heretofore, to largely govern the question of change of motive power in the more extended fields.

It is certain that there must be co-operation in the important matter of power supply, and it is probable that the whole trunk line problem will appear less formidable with the elimination of the requirements of the installation of individual power houses with their necessary reserves, and the use of current from great power houses properly linked together which in addition to their reliability can make full use of the diversity factor in a multiplicity of demand.



# Accounting Inconsistencies and Fallacies\*

*Author uses projective test to show up fallacies in so-called principles. Criticizes commission provisions for appropriation accounts, sinking fund reserves, amortization of debt discount and expense, and other points*

By HOMER A. DUNN, C. P. A.

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**I**NCONSISTENCIES and fallacies in accounting are the results of indifference, vacillation, ignorance, expediency, casuistry or dishonesty of purpose. Indifference, vacillation or ignorance may produce either or both, but where expediency, casuistry or dishonesty of purpose govern, principle does not abide in accounting or other human activity, and the inevitable result is fallacy.

Inasmuch as comparison is the measure of efficiency in human endeavor, conclusions drawn from comparisons will be fallacious if consistency is not maintained even to the highest refinements. Consistency cannot be maintained where indifference or ignorance prevail. Vacillation in regard to the maintenance policy may produce inconsistencies unless there be accounting provisions against them. Such vacillation may run back and forth between two extremes, but, while it may not change the total maintenance expenditure in a given period of time, alert, competent and scientific accounting may so keep the accounts in adjustment as to prevent distortion in graphic chart expression of their relations, if only it is given authority approximating that of the actuarial function in life insurance.

## INCONSISTENCIES INVOLVING MATERIALS AND SUPPLIES

Inaccuracy or unreliability in accounting for the use or consumption of operating materials and supplies is not an unusual source of inconsistencies. Many who are charged with the function of management lay great stress upon integrity and accuracy in the handling of and accounting for cash, but fail to realize that consistent comparisons of operating costs are dependent upon the application of the same qualities to the handling of and accounting for materials and supplies. It seems never to occur to them to place the accounting for materials and supplies under the jurisdiction of the officer charged with the general accounting function, even to the extent of supervision over the inventory tests of the accounts.

As bearing upon the need for such supervision, I once came in contact with a very unusual situation—unusual because the developments were quite the opposite of the ordinary. Inconsistencies in comparisons brought about investigation, and the development was that, because the company was enjoying some unusual revenue prosperity, an operating officer whose range of control was sufficient for the purpose conceived the idea of charging out more operating materials and supplies than were being used. He did this not with dishonest intent but with the end in view of accumulating a secret reserve for use without effect on expenses when a recession in revenue might be experienced and when there might be greater watchfulness over the relation of the operating costs thereto.

The "principle" in accounting to which I made reference in the opening paragraph is the one defined in the Century Dictionary as: "A truth which is evident and general; a truth comprehending many subordinate truths; a law on which others are founded, or from which others are derived; as, the principles of morality, of equity, of government, etc. \* \* \*" Lexicons give the application of definitions to law, to engineering, to architecture, to chemistry, to medicine, to mathematics and to society, but not to accounting. Some day, perhaps, a practical man will be drawn upon a lexicon review board, and recognition then will be given to accounting as one of the sciences. An accounting application of this definition would add to the first clause "or which will stand the test of logic, as in accounting."

This would give rise to the question as to how to make the test. The best method I have found is to widen projectively the relations between quantities or factors and consider the result. A notable situation for illustrative purposes is the requirement in an accounting order of the Interstate Commerce Commission directed against steam roads that the balance of the "Hire of Freight Cars" account, arising solely from debits and credits for the interchange use of such equipment, shall not enter into the operating results of the respondent carrier but shall be treated as income derived from sources other than operations—in other words, shall not be included in or be set off against the operating revenue, according as the balance may run; and the further requirement that the respondent's entire cost of maintaining its freight cars (repairs, depreciation and retirements), shall be charged to operating expenses.

For a projective widening of relations, assume that a connecting railroad 100 miles in length, which has been operated under the ownership of 600 freight cars with a need for twice that number, and under the condition of charging the hire of other carriers' freight cars to non-operating income, has been producing net operating revenue at the rate of \$600,000 per annum; and that this railroad, discovering a large shortage of freight cars throughout the country and finding itself in an exceptional position thereby, acquires and places in service 10,000 additional freight cars. Inasmuch as the hire derived from these additional freight cars is required to be credited to non-operating income, and inasmuch as the normal cost of owners' repairs (distinguished from users' repairs under interchange rules), depreciation and retirement are required to be charged to operating expenses and would amount to more than \$600,000 per annum, the result would be to convert the previous net operating revenue into a net operating loss.

Such a change would be wholly illogical in the light

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of the cause and conditions. If the "Hire of Freight Cars" account as set up were charged and credited *per contra* with the amounts necessary to make the operating expenses represent the true costs of operating maintenance for both the other carriers' freight cars and the respondent's own freight cars, there would be no difference in the net operating revenue, whether the respondent owned 600 freight cars or 10,000 freight cars. Furthermore, the "Hire of Freight Cars" account would reflect a true non-operating income. It is by such projections that tests of principle may be made and fallacies be avoided.

#### THE FALLACY OF APPROPRIATION ACCOUNTS

I have wondered why the Interstate Commerce Commission, in its 1914 accounting classification for electric railways, substituted "Corporate Surplus" for "Profit and Loss Surplus," and made a subdivision into five primary accounts, viz.: No. 447, "Additions to Property Through Surplus;" No. 448, "Funded Debt Retired Through Surplus;" No. 449, "Sinking Fund Reserves;" No. 450, "Miscellaneous Fund Reserves," and No. 451, "Profit and Loss—Balance"—unless it was to lead the electric railway companies into the trap of definite appropriations to accounts 447 to 450, to be later closed by legislative prohibition against any use of the credit balances therein for dividend purposes, or to be held subject to the commission's permission of transfers back to the "Profit and Loss" account. Whether or not a profit and loss surplus is available for distribution depends upon the cash position, certainly not upon acts of appropriation. The fact that these appropriation accounts were not made mandatory stands as evidence that the Interstate Commerce Commission did not believe that it could enforce them.

Let us apply the projective test for the purpose of ascertaining whether or not there is anything fallacious in this plan of appropriation accounts with apparent intent to limit dividend distributions to the resultant profit and loss balance. Inasmuch as it appears that the "Sinking Fund Reserves" account is but intermediary to the "Funded Debt Retired Through Surplus" account, we may assume for the purpose that the entire funded debt has been retired and that the sinking fund reserves have been closed. Assume also that the original issue of the funded debt exceeded the tangible value of the property, i.e., covered a part of its franchise value, and that upon the last redemption and retirement of the funded debt the franchise value had been entirely amortized. Assume also that throughout the period of the redemption and retirement of the funded debt and the amortization of the franchise value, large expenditures were made for additions to property and that amounts equal to those expenditures were transferred by appropriation from the "Profit and Loss" account to "Additions to Property Through Surplus" account. Assume further that as a result of these appropriation transfers and amortization charges there is a debit balance or deficit in the "Profit and Loss" account. It is too obvious to be gainsaid that since the amortization of the franchise value took nothing from the company's treasury, there should be a substantial amount available for dividend distribution. The fact that, in the face of such a condition, there is a debit balance, or deficit, in the "Profit and Loss" account exposes the fallacy of this appropriation scheme.

Apparently there did not occur to the Interstate Commerce Commission the practical proposition of setting up a group of accounts, as "Common Shareholders' Accounts," consisting of "Common Capital Stock Outstanding," "Common Capital Stock Conversion Obligation," "Common Capital Stock Premium or Discount," "Governmental Grants in Aid of Construction," and

"Profit and Loss Surplus" the total of which would represent the capital interest of such shareholders in the business as though collectively they were an individual and sole proprietor.

In the interest of the shareholders of the companies affected by the Interstate Commerce Commission classification, and of the other companies whom you represent, I send by the members of this association a message to executives and directors to beware of appropriation accounts and acts of appropriation. They should be shunned as fallacious and dangerous. That the surplus of a corporation is the excess of its assets over the sum of its liabilities and capitalization has been accepted and recognized as a fact for as long as corporate organization and accounting have existed. It is immaterial whether the account representing this excess is entitled "Profit and Loss" or "Surplus." Whichever it may be, it needs no subdivision in its finality. The only purpose of preceding either with the primary accounts of revenue, expense and income is to have ready at hand, in accounts, the data necessary for determining the causes of gains or losses, thereby avoiding for such purpose recourse to analysis of a single account, the former method being more accurate and economical than the latter.

#### COMMISSION RULES SHOW LACK OF HARMONY

As illustrating the lack of harmony as between the Interstate Commerce Commission and the state public service commissions, and as between many of the latter, the full correction of which never will be realized excepting through a greater nationalism in our political organization, it is noticeable that in the accounting order of the Ohio Public Utilities Commission directed to electric utilities, there is a grouping of accounts under the general title "Proprietary Interests, Reserves and Profit and Loss." This accounting order does not require or make provision for appropriation accounts other than one for miscellaneous appropriations, which are specified as optional appropriations from surplus for gratuities, gifts and reserves. While this order provides an "Income and Profit and Loss" account for the current period, it is further noticeable, however, that this is a temporary account to be closed into the final "balance sheet account" designated as "Surplus" or "Deficit," according as the balance may run. The Wisconsin Railroad Commission saves itself from like criticisms by the omission of the "Profit and Loss" account from its accounting orders.

#### SINKING FUND RESERVES ARE VIOLATIVE OF PRINCIPLE

There is similarity between the federal commission and the Ohio commission and several others in regard to sinking fund reserves, and this is one of the greatest fallacies to be found in commission accounting orders. This occasion does not warrant the time necessary to an adequate discussion of the subject. Instead, I will call your attention to an article by my esteemed partner, Charles S. Ludlam, which appeared in the March, 1914, issue of the *Journal of Accountancy*, under the title "Treatment of Sinking Funds," and in which he makes very clear the fallacy of the sinking fund reserve. Obviously if a sinking fund reserve is fallacious, the accounting orders of some of the commissions which provide that the increment to the sinking fund shall not go into the corporation's income account are equally fallacious and violative of principle.

#### AMORTIZATION OF DEBT DISCOUNT AND EXPENSE

I cannot leave the Interstate Commerce Commission without calling attention to an absurd inconsistency



which has been copied by some state commissions in regard to the amortization of funded debt discount and expense. The requirement is that the income account for this amortization shall be charged during each fiscal period with the proportion of the unextinguished discount and expense on funded debt obligations applicable to that period and that this proportion shall be determined according to a rule, the uniform application of which throughout the interval between the date of sale and the date of maturity will extinguish the discount and expense on funded debt; that the charge to this account for any period shall not be either greater or less than the proportion applicable to that period, so long as any portion of the discount and expense remains unextinguished; and that the accounting company may, at its option, charge to "Profit and Loss" account all or any portion of the discount and expense on funded debt remaining at any time unextinguished.

Can one conceive of anything more illogical than that the income account may be wholly relieved of charges for the amortization of funded debt discount and expense but may not be partially relieved therefrom through a write-off to "Profit and Loss" of a portion of the total discount and expense and amortization of the remainder throughout the interval between such write-off and the maturity of the debt? I do not believe in the write-off to "Profit and Loss" of any part of funded debt discount and expense, because I cannot clear from my mind the fact that it is just as much a part of the cost of using borrowed money as contractual interest, and because it should not be omitted from the net income to be considered in rate cases, or from the net income subject to the federal income tax.

In sustaining an application for validation of bonds to be issued and sold under a mortgage the counsel for a company included, in addition to property expendi-

tures, a considerable amount of discount on bonds previously validated under the same mortgage. The commission accepted the explanation of reimbursement for such discount which was presented and validated bonds to the amount of the application. Awakening later to the fact that they had validated an over-issue of bonds by reason of the inclusion and their acceptance of the item of discount, an order was issued requiring that, pro-rated over a period of six years, the company should write out of its "Road and Equipment" account and charge "Profit and Loss" account the amount of the discount item. This was done in total disregard of the fact that the discount in question had not been charged to the "Road and Equipment" account but, on the contrary, had been written off against "Profit and Loss" account prior to the application for validation. Apparently it did not occur to the commission that it was improper so to write down the "Road and Equipment" account, and that the proper remedy would have been to reduce correspondingly the validation of bonds upon the occasion of another application which the conditions made altogether probable.

In another case a ruling was made to sustain the text of the commission's accounting order and was to the effect that while interest maturing on the day next succeeding the date of the balance sheet should be included in current liabilities as interest matured and unpaid, the amount of bonds maturing on the same date, and to which the interest attached, should not be included in current liabilities but should be included in funded debt unmatured.

Lest one form the impression that I am opposed to commission accounting orders from all angles, let me say that such is not the case and that I believe they contain much that is good. I do not disagree with commission orders, but I do disagree with their inconsistencies or fallacies.

## The Work of the Statistician\*

*Separate branch to handle electric railway statistical work is a step in the right direction, owing to commission requirements and the need of comparative data and exact costs. Examples of work of a statistician*

By W. E. JONES

Statistician The Connecticut Company, New Haven, Conn.

ACCORDING to the Century Dictionary the definition of a statistician is "one who is versed in or collects statistics."

The officers of the Connecticut Company reached a conclusion that it would be a most excellent idea to have a man of this type to collect and compile statistics in order to assist the officers and fortify them with knowledge so they could plan to meet the high operating expenses of present day operations and have something left for the stockholders of the company. They realized that it would be necessary to have not only the ordinary results of operations from the accounting department, but also many detailed statements and statistics, going back over a number of years.

### METHODS FOR PRESENTING STATISTICS

In the presentation of statistics, there are generally two common methods employed: (1) By adhering strictly

to a plain display of facts, classified under proper headings in condensed form and showing such continuity or sequence in time

and incident as to show clearly a result, the source and genuineness of which is not subject to doubt or surmise. (2) A second method is frequently adopted by speculative statisticians who use as a basis the accounts of a fiscal period, and by process of extreme analysis, endeavor to build a statistical fabric with the object of proving or disproving certain theories.

A plain relation and classified presentation of principal facts, as portrayed in the first mentioned plan, is immeasurably preferable, inasmuch as the plain truth thereof is sufficient for the mind of any average street railway man to grasp, and adequate for the purposes of mental comparison and conclusion. The second method, while based upon a foundation of facts, is, as a rule, so colored or accentuated in many ways, and so burdened



\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Accountants' Association on Oct. 9, 1916.



with unnecessary detail and obtruse analysis, as to tend to mislead the open-minded railway official who is seeking facts only, and induce him to accept what may be erroneous or biased conclusions, thereby falling short of a comprehensive grasp of prominent facts and truths. Needless to say, the first method is followed in all of our work.

#### MORE MINUTE STATISTICS NEEDED

Street railway officials all over the country have found that the cost of labor, material and everything pertaining to the production of transportation has increased, while the fares have remained the same. Therefore, it is necessary under present operating conditions to have information showing unit costs of power production, maintenance of track and roadway, maintenance of buildings, upkeep of rolling stock, and this does not mean merely the figures which are ordinarily compiled in the accounting departments of street railways, but further unit costs so as to enable the officers to know the relative efficiency of various types of equipment. Moreover, a great many times it is necessary to know the cost of operating one particular line, or even a single car on a line. This information is not necessary in the ordinary sense, in order to compile information for the state commissions, or for the Interstate Commerce Commission. Competition has also developed in the form of motor transportation, and this has added to the necessity of compiling more minute statistics.

#### EXAMPLE OF STATISTICIAN'S WORK— MILEAGE RECORDS

In most street railway companies the statistical information is compiled under the jurisdiction of the general accounting official. Such information was formerly compiled by some of the clerks in the comptroller's office of the Connecticut company. It seemed desirable, however, to have it compiled by an accountant who made it his entire business to look after statistics, and a new branch was established in charge of a statistician, under the jurisdiction of the comptroller. In order to show more clearly the work of the statistician, I will outline briefly a few methods followed and refer to a number of subjects that have been analyzed where the statistics have brought to our attention valuable information.

In most street railway statistics the unit of cost is the car-mile, and the question of single or individual car mileage is one of the first steps taken after opening the statistician's department. A great many companies merely compile car mileage from the regular running schedule, plus or minus interruptions and extra cars run, but there are a number of companies which compile mileage on the single or individual car basis and for the benefit of some of the accountants, the method followed is briefly outlined. The mileage is figured from the conductors' day cards from day to day, and the day card compared with the schedule running time of that day and such adjustments made as may be necessary due to loss of time on a given route in that day's operations. If more than one car has been used by a crew on a certain route, the exact mileage is figured for each car and recorded on a form provided for that purpose under route heading. This mileage is then transcribed on to a form which is sent to the statistician's office, and recorded on one of two different colored cards as a permanent record for the various equipment. A white card is used for the passenger car mileage. A salmon colored card is used for express, freight, work cars, snow plows, sand cars and other miscellaneous equipment.

The mileage is posted daily and a running total is kept in order that a report may be made from time to time for the inspection of the equipment. The chief

engineer of power and equipment designates the number of car-miles that each type of equipment should be operated before being reported for inspection. Some of the cars are reported on an 800-car-mile basis and others on a 1000-car-mile basis, while there are a few cars on interurban lines that are inspected on a 1500-car mileage basis. Most of the cars, however, are inspected on a 1000-car-mile basis. A daily report is prepared in the statistician's office covering the cars to be reported for inspection. The form is made up in quadruplicate copies. The original is sent to the manager or superintendent, the duplicate to the master mechanic and the triplicate to the barn superintendent or foreman, while the quadruplicate is retained in the general office files. This report is prepared to show the various cars that have run approximately the number of miles allotted to their type of equipment, and to have the operating department arrange for the proper inspection. The report is sent out one day in advance of the inspection to enable the operating departments to line up the cars for inspection the following day. This inspection system has shown that there is a saving in the inspection department, and our equipment is kept in much better condition than it was under the old system of inspection.

#### WHEEL, AXLE AND SIMILAR RECORDS

Another branch of statistics or cost accounting which is under the jurisdiction of the statistician covers the wheel, axle, gear and similar records. This information is compiled so as to give complete information as to when car wheels are pressed on the axles and when the axles are placed under certain cars. A form is filled out by the foreman in the wheel department and sent to the master mechanic, showing the wheel numbers, axle number, date, number of tons pressure, number of the mate of wheel, type, size, etc. This report is recorded on a car wheel and axle record. When the wheels and axles are placed under the cars a report is sent by the truck foreman to the master mechanic, and a record is then made on the car wheel record and axle record, showing the date and number of car wheels that are placed under the equipment. These records are then put into the operating equipment file and remain there until these wheels or axles are removed. Then the same forms are used again by the foreman, and their record is transcribed onto the car wheel records and axle records in such a manner that the master mechanic is able to determine how long the wheels or axles have run.

At the end of each month a report is made by the master mechanic to the statistician, advising him as to the date when the car wheels and axles were removed from service during the month. The statistician then prepares a statement for the supervisor of equipment, showing the car wheels and axles that have been removed from cars on all divisions, giving the mileage made, and he (the supervisor of equipment) can then judge what make or type of wheel is best for service on each division.

#### STATEMENTS CONTAINING USEFUL STATISTICS

The statistical department also prepares monthly statements which contain useful statistics for the operating officials. A few of these statements are as follows:

(1) A comparative income statement. This shows increases or decreases in the revenue and operating expenses for the month and period to date, as well as a number of statistics, these being the percentage of operating expenses to earnings, daily average receipts, daily average expenses, revenue per car-mile, operating expenses per car-mile, total car mileage, revenue passen-



gers and transfer passengers carried. This statement (which is in addition to the regular income statement made out in accordance with the Interstate Commerce Commission classification of accounts) is used for the convenience of the officers to pass information to bankers or others interested. (2) Earnings and statistics by lines. This gives earnings per car-mile and per car-hour and density of riding, etc. (3) Detailed power station expenses and costs.

Further light on the work of the statistician may be given by enumerating a number of special statements prepared, such as charts showing high points in operating expenses of certain power stations; a statement of lay-overs on some of the divisions, showing the per cent of time lost on account of the layover, the total hours lost and the total hours that would be lost, if certain schedules were to be continued for one year; statements compiling statistics of other companies for comparative purposes, and statements of expenditures on account of municipal requirements for a period of years.

It is to be noted that substantially all of the above statements are merely along the line of statistics and not what, in the ordinary sense of the word, could be

called bookkeeping work, or general office work which all street railways are obliged to have done in order to comply with state or commission requirements. As stated in the first part of this paper, competition is keen, costs are high and no portion of a street railway can be operated profitably under the present conditions unless the officials know absolutely just what every operation costs.

In addition to the minute statistics required by the officers of the companies, the commissions have in some instances extended their requirements, and this has put a further burden upon the accounting department which brings out the fact that the establishment of a statistical branch in connection with the accounting work of street railway companies is a step in the right direction, and a number of accounting officials have recognized this and are establishing such departments. Officers are realizing more and more the value of statistics, and as the demand for this sort of information increases, it would seem that the presidents and operating officials, as well as the accounting heads, will realize the necessity of the statistician. It is predicted that more appointments to such offices will undoubtedly be made in the near future.

## The Census of Electrical Industries\*

*Census Bureau has unique record of United States electrical development. Gross value of products and income amount to \$1,201,000,000 annually. No other industry changed so rapidly or completely in one generation as electric railways*

By WILLIAM M. STEUART

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THE United States, the British Empire, Germany and France are by far the most important industrial nations. In magnitude and diversity of industry, the United States ranks first. While the multiplicity of inventions, the closer commercial relations of nations, the more general and thorough education of the masses, the utilization of natural resources and other conditions have aided in this general advancement, we believe that electricity has been the most important single factor. Those of us who are fifty years of age can remember when the telephone was coming into commercial use, and the small experimental central stations were being installed in the most favored localities. Less than thirty years ago practically all of the street cars were drawn by horses. With the exception of the telegraph, all the industries depending upon the commercial use of electricity have come into existence and been developed during the present generation.

The development of the telephone has been the wonder of the age. Equally astonishing has been the expansion of other industries in the electrical field. There are now about 1,500,000 automobiles registered in the United States, and the reports of manufacturers indicate that the annual production will amount to 1,500,000. The increased popularity of the automobile is due largely to the application of electricity. Practically every car now produced is equipped with an electric self-starter and lighting system. The hand crank and oil acetylene lamps are rapidly disappearing. The United States easily takes first place in the production

and utilization of electric current for commercial and industrial purposes. Our central stations, electric roads, telephone and telegraphs now give direct employment to approximately 1,000,000 people, and the industrial, commercial and social well-being of the country is dependent on them. We can conceive the conditions that would exist if electricity should suddenly lose its power.

### IMPORTANT TO HAVE STATISTICS

It is contended by some that these conditions are well known, and it is not necessary—in fact, serves no useful purpose—to compile statistics in regard to them. Fortunately, we are not all of this opinion. It is important to the nation as a whole to know the amount of capital invested in electric railways, the miles of track, number of cars, persons employed, etc. Each company has these facts for its own properties and cannot do business without them, and the nation is very much in the same position. We cannot know what our combined efforts amount to, whether the net result of successes and failures in business is a gain or a loss, unless the government compile statistics to show the magnitude of operations for representative periods. Certainly we would not be an up-to-date people unless we knew to a reasonable degree of certainty the extent of our various industries.

With but few exceptions, the companies now appreciate this and furnish the data without question. A few years ago there was an entirely different feeling,



\*Abstract of paper delivered before the Atlantic City convention of the American Electric Railway Accountants' Association on Oct. 10, 1916.



and the majority of the companies contended that statistics concerning their operations were of such a personal nature that they would not furnish them to the government. The first complete census of the electric industries covered 1902, and I remember that many companies were not inclined to make reports. Some were very disagreeable about it and made it as difficult as possible for the agents to secure the data. The bureau sought the advice and assistance of the Accountants' Association and others who appreciated the value of statistics. A spirit of co-operation was finally established, but after trying for somewhat more than a year to secure satisfactory returns for all companies, the census was finally printed without the data for some important companies.

#### MULTIPLICITY OF STATISTICS DEPLORED

The absence of statistics for the early periods of our history makes it impossible to show the actual conditions existing at that time, but we are now in danger of giving too much attention to statistics. We are often met with the assertion that reports are required by government agencies that answer no useful purpose, and that some arrangement should be made to standardize the reports required by the various governmental bureaus, so one report would answer for all. It does seem unnecessary for the United States, the states, and in some instances cities and counties, to secure reports containing, in part, the same information. The Census Bureau appreciates this and is constantly working for co-ordination in the compilation of statistics. We hope that before long some scheme will be devised to avoid the multiplicity of reports.

#### UNIQUE RECORD OF ELECTRICAL DEVELOPMENT

The Census Bureau has made a complete record of the development of the electric industries in the United States from their incipency. It is a record that can be referred to with pride, because it is based entirely on American ingenuity and enterprise. No corresponding record has been made by any other nation, or for any other industry in this nation. These records contain separate totals for the manufacture of electrical machinery and apparatus, the telephone and telegraph industry, the central electric stations and the electric railways.

#### THE ELECTRICAL MANUFACTURING INDUSTRY

These industries all depend upon the manufacture of electrical machinery and apparatus. The number, variety and scientific accuracy of these machines has increased enormously during the last twenty years. In no other branch of manufactures has there been such rapid increase in the number of different kinds of machines, and at the same time such a standardization of products. The scientific precision required has tended to specialization, and it is now one of the most highly specialized industries of the country. Most of the products are made in a few perfectly equipped factories. While there are more than 1000 establishments manufacturing these products, the majority of them are small and make a specialty of a particular machine or part of a machine. The capital invested in the industry exceeds \$360,000,000, it gives employment to about 150,000 people, and the annual production is valued at approximately \$400,000,000. It covers the entire field, from the smallest piece of the most delicate measuring instrument to the complete locomotive and the equipment required for a modern central station.

#### 5221 CENTRAL STATIONS IN 1912

The last census, that of 1912, enumerated 5221 central stations which furnished electrical energy for light, power and heat; for manufacturing, mining, and other

commercial enterprises; for private dwellings, and for public use in lighting streets and parks. In addition to these there are many thousands of stations, some think as many as 75,000, operated by mining companies, factories, hotels, large stores and other enterprises. There are also a few stations in governmental institutions established for the exclusive use of the institutions that are not covered by the census. While the number of electric railways doing central station work has increased, there has been a still greater increase in the magnitude of such work, and the annual income from the sale of current by the electric railways in 1912 was nearly \$36,500,000. The total annual income of central stations from electric service and that of electric railways from the sale of current amounted to \$323,480,000.

Central stations are operated under such a variety of conditions that it is necessary to make some grouping of the plants in order to bring together the statistics for those engaged in the same class of work. The primary grouping shows separate totals for plants operated under private and government ownership. The government plants are operated largely by municipalities. They frequently extend their operations into the commercial field and sell electricity to the general consumer, but they are conducted under conditions radically different from those of the privately owned plants. There were 1562 municipal stations enumerated at the census of 1912, and their prime movers were reported as having 559,000 hp. During the five years from 1907 to 1912 there was a net gain of 310 in the number of these stations. Of this number 301 were new. There was an increase of nine brought about by the difference between the number whose ownership had changed from commercial to municipal and those that had changed in the opposite direction, from municipal to commercial, and seventeen then went out of business. Thus far the municipal stations have been successfully conducted in the smaller cities and towns where the methods of doing business are the topic of general discussion, and the transactions are on a limited scale. We, therefore, find that the majority of these stations are small, and while they form about 30 per cent of the total number of all stations, the horsepower of their prime movers forms only 7.4 per cent of the total power. The municipal stations have, during the past decade, increased more rapidly than the commercial stations, but relatively, in the magnitude of work done, they have been stationary, and in some respects have retrograded. In 1902 the kilowatt capacity of their dynamos formed 9.4 per cent of the total from all stations. By 1912 this proportion had been reduced to 7.7 per cent. These stations are well distributed throughout the country—they were found in every state, but the largest numbers are in Michigan, Minnesota and Ohio. While the competition with commercial stations is pronounced in some localities, it is of minor importance in the country as a whole.

Considering the private and government owned stations, we are surprised to find how completely the map of the United States is covered with them. With the exception of the remote sections of the country, where there is no industry, wiring for some electric purposes, telephone, telegraph, railway or central station work is found in practically every township. The advances made in long-distance transmission of electricity and its application to industrial processes in rural districts has greatly extended the central station field of activity. The prime movers in the central stations in 1902 had only 28 hp. to every 1000 of the population. In ten years this ratio increased to 79. The ratio of horsepower to population is highest in the Western states, where it is about 200, and smallest in the South Central, where it is about 25.



In investment, equipment and work done during the year, the electric railways are of far greater importance than the 5112 central stations. To begin with, the electric railways had a great advantage over other branches of electric industries. They took over plants already in existence and more or less adapted to their work. With them it has been a remodeling and extending process. For the central stations, telephones and telegraphs, entirely new plants had to be installed, new fields of work developed and new methods of business devised. The census, therefore, found the railways more perfectly organized and in better position to furnish statistics of their operations than the others. This condition was due largely to the efforts of the Accountants' Association. It quickly appreciated the value of census statistics and appointed a committee to co-operate with the bureau.

#### HOW THE ELECTRIC RAILWAYS HAVE GROWN

The reports for the last four censuses contain a very interesting detail history of the electric railways. They show the conditions of operation during each census year, the investment, equipment, work done, receipts, expenditures and the improvements in machinery and methods perfected during the period between the censuses. In 1890 animals, cables, and steam were used as motive power. Horse roads operated 5660 miles of track. These have now virtually passed out of existence; the gasoline motor has come into operation, and various other kinds of motive power have been tried. They have practically all been superseded by electricity. In 1912 there were 943 companies operated by electricity, twenty-one by cable, thirteen by animals, nine by gasoline motors and nine by steam. The use of electricity has so extended the field of operations and made such radical changes in the methods of business, that the roads of to-day serve an entirely different purpose from the street railways of twenty-five years ago. They are no longer confined to cities, but are fast absorbing the interurban and rural traffic. There were 16,365 miles of interurban and 24,966 miles of city and suburban track at the last census. As a considerable portion of the city and suburban track is located outside the corporate limits of cities, it is probable that half the trackage is operated in rural sections, but handling a class of traffic that could not be handled by the steam roads and meeting requirements of construction and operation that could not be complied with by any other class of roads.

The capitalization of electric railways is now \$5,000,000,000; it was more than \$4,700,000,000 in 1912; in 1890 it was \$450,000,000. The increase in capitalization is hardly a true indication of the increase in the industry. The number of revenue passengers carried increased from 2,000,000,000 to 9,500,000,000, and the income from operations from \$91,700,000 to \$585,900,000. The number of passengers carried on these roads in 1890 was sufficient to give thirty-two rides to each inhabitant of the United States. The number carried in 1912 was sufficient to give 100 rides to each inhabitant. It is safe to say that no other industry has increased so rapidly and undergone such a complete change within a generation.

Just half (50.8 per cent) of the railways produce their own power. The census shows that there is a tendency, more marked in some localities, to purchase power from central stations. The rapid increase in this practice is evidently based on economics not possible by roads that operate their own power plant.

#### OPERATING RATIOS AND INCOME DEDUCTIONS

In presenting the financial statistics the bureau adopted the grouping according to size of companies

that is used by the Interstate Commerce Commission. In addition, separate totals are shown for (1) companies that do not operate commercial lighting plants; (2) those that do operate such plants; (3) those operated only a part of the year, and (4) horse railroads. The grouping of the companies according to size enables a definite statement of relative importance of the large and small companies. It appears that only 9 per cent of the operating companies had an annual income from railway operations of \$1,000,000 or more, but they operate 51.9 per cent of the track of the entire country, and their gross income forms 75 per cent of the income of all companies. This group includes the companies operating in urban districts of highest density, and their track mileage, passengers carried, income and expenses have increased more rapidly than those of any other group. It is instructive to compare the different items of income and expenses for the companies in the several groups. These items are shown in detail for each group and then summarized in convenient form. For example, the operating ratio for all companies is given as 58.7, for the large companies 56.7, for the medium size companies 61.7, and for the small companies 68.3.

The separate showing for companies doing exclusively railway work, those doing central station work, and those operated only a part of the year or under abnormal conditions assists in an exact analysis of the returns for legitimate railway business. The operating ratio of the companies in the first of these groups was 59.2, of those in the second group 56.0, and those in the third group 73.4. These percentages differ very much from those shown for the companies grouped according to size.

Considerable interest has recently been attached to the statistics for deductions from income. The census includes in these items taxes, interest, rent of leased lines and terminals, charges for sinking funds and various miscellaneous deductions. During the ten years from 1902 to 1912 these items increased by 146 per cent. The three largest items are interest, \$98,000,000; rent, \$45,000,000, and taxes, \$35,000,000. The largest amount of increase is shown for interest while the highest rate of increase (168 per cent) is shown for taxes.

The census has made a very careful analysis of the financial statistics of electric railways. Probably it is more elaborate than is necessary for practical purposes, although the committee that was appointed by the Accountants' Association to make recommendations for the improvement of the report would not give any suggestions other than those for the modification of the schedules. The bureau desires to publish these statistics in a manner that will be of greatest interest, and we hope you are considering the report of 1912 with the intention of making some recommendations for 1917.

#### TELEPHONE AND TELEGRAPH DEVELOPMENT

The other two branches of electric industries, the telephone and the telegraph, are unique. The country is full of small telephone companies. Many of them are small farmer lines, operated under a co-operative arrangement or mutual understanding. They have no regular employees or no income, but are maintained by assessments. It is impossible to collect statistics concerning the financial operations of these small systems. The bureau succeeded in collecting statistics of wire and number of instruments for 32,233 systems. More detailed statistics were collected for about 2000 of the larger companies. There were more than 20,000,000 miles of wire and about 9,000,000 telephones in use in 1912. At the beginning of the census year 1880 the industry was of little importance, but at the end of 1912 it represented one of the greatest interests of the coun-



try. It has continued to develop probably more rapidly than any other industry in the country, and the statistics for 1912 are no indication of its present magnitude.

The telegraph is the oldest of the four industries devoted to the commercial use of electricity. There were twenty-seven commercial land and ocean telegraph systems in operation in 1912. There were 1,800,000 miles of wire in use, and about 110,000,000 messages transmitted during the year. The total annual income amounted to \$64,762,843. The telephone has long since outdistanced, and in some respects superseded, the telegraph.

The census includes the fire alarm and police patrol

signaling systems of the cities, but these are not operated commercially and the statistics relating thereto have little in common with the other electrical industries. There were 1397 signaling systems in 1912 operating 90,000 miles of wire and more than 80,000 boxes or signaling stations.

Aggregating the four commercial branches of electric industries, we have 8424 establishments, companies or systems in operation; they give employment to 582,000 salaried officials, clerks, and wage earners; pay out annually in salaries and wages \$383,000,000, and the gross value of products and income amounts to \$1,201,000,000.

## Commission Valuation for Rate Purposes\*

*Author discusses origin of fair-value rule. Cites cases allowing going value when actual costs are proved. Makes plea for free presentation of facts by companies*

By JOHN E. BENTON

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SO well understood now is the constitutional principle that no state through legislature or commission may reduce rates to a point where a fair return on the fair value of property cannot be earned, that it may surprise some to be reminded that such was not always the law. The fourteenth amendment was ratified by the requisite number of states in 1868, but in 1877, almost a decade later, the United States Supreme Court, in *Munn vs. Illinois* (94 U. S. 113), held that a state might regulate rates exacted for the use of any property devoted to public service, and that what was reasonable compensation for the owner was a question for the legislature to determine and not for the courts. Neither the majority nor the minority opinion then grasped the idea of a legislative power to regulate curbed by a judicial power to protect against confiscation. That idea was developed gradually.

Finally, in 1894, *Reagan vs. Farmers' Loan & Trust Company* (154 U. S. 362), the United States Supreme Court reviewed the facts, found that the railroad concerned had \$15,000,000 of bonds and \$9,755,000 of stock outstanding; that both represented actual investment; that the stock had never paid any dividend; that the rates before in effect had been insufficient to enable the company to pay all the interest on the bonds; that the stockholders had been obliged to pay an assessment to avoid foreclosure, and that the commission rates had operated to reduce the revenues so substantially that the company could not pay more than one-half the interest on its bonds. "Can it be," said the court, "that a tariff which under these circumstances has worked such results to the parties whose money built this road is other than unjust and unreasonable?" The rates were unanimously held invalid as in violation of the fourteenth amendment.

Thus did the United States Supreme Court, almost thirty years after the amendment was adopted, for the first time hold rates invalid as confiscatory within the meaning of the amendment. This first case is interesting because the facts emphasized by the court were the facts shown by the accountant's records—the amount invested and represented by stock and bonds;

the interest and dividend record, and the financial history of the corporation. The court was acting, and made that fact clear, to safeguard the investment. But as yet no rule was laid down for application in future cases.

### ORIGIN OF THE FAIR VALUE RULE

It was in 1898 that *Smyth vs. Ames* (169 U. S. 125) was decided. In that case the Union Pacific Railroad was contesting rates prescribed by a statute of the State of Nebraska. Oddly enough, the State, represented by William Jennings Bryan, was contending that any return to which the company might be entitled must be computed upon the reproduction cost of the property, while the company was contending that it should be computed upon the original cost, which it claimed to be shown by the amount of its stock and bonds outstanding. The road had been constructed in war times, when everything was high. The court seems to have been unwilling to accept capitalization or original cost as the base upon which to compute the ratio, because it might be unfair to the public. It was also unwilling to accept the cost of reproduction because it might be unfair to the owners of the property. The result was the fair value rule which was laid down by the court as follows:

We hold, however, that the basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And, in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted

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from it for the use of a public highway than the services rendered by it are reasonably worth.

These cases show that no one can afford to be dogmatic about what the law is. Law is not immutable but is constantly being molded by the courts to meet the needs of society as those needs are conceived by the judges. The "fair-return-on-fair-value" rule was devised by the court with the intent to compel the legislative branch of the government, in the exercise of the rate-making power, to avoid confiscating investments made in property devoted to public use. The rule does not purport to be a formula which can be applied mathematically to all cases. Original investment, as a base upon which to compute the return, might be fair in some cases and not fair in others; so also might the reproduction cost, or the amount or the value of the securities outstanding. Accordingly, the court followed the more cautious course of saying that all of those factors ought to be taken into account and given such consideration as was just and right in each case. This left the ultimate value to be determined as a question of fact upon considerations of justice in view of all relevant evidence.

#### TERM "VALUE" HAS LED TO UNCERTAINTY

The use of the term "value" has undoubtedly been the cause of much uncertainty as to the real intent and meaning of the rule. The owners of public service properties and their representatives immediately perceived that if the term were to be taken in the sense of exchange value, not much latitude for the regulation of rates was left. This would necessarily be true because the earning capacity of a property at such rates as could be collected from the public would determine its exchange value. If these rates could not be so reduced as to prevent the earning of a return upon that value, no legislative reduction of rates would be possible. Naturally such owners and representatives have earnestly contended for that construction, while those who desired the legislative power of regulation to be unimpaired have argued for some other construction.

#### EXCHANGE VALUE NOT DETERMINING FACTOR

Candid consideration of the entire opinion will, however, satisfy most persons that the court intended to use the term "value" in a somewhat special sense. To begin with, it is not to be supposed that the court intended practically to take away from the states the power of rate regulation—a power which in the *Munn vs. Illinois* case the court had said the legislature in common law countries had exercised from time immemorial. Nor can it any more be supposed that the court intended to declare a rule which would prevent the reduction of exorbitant charges, if made, merely because the return from those charges had been enjoyed long enough to give the property a greatly enhanced exchange value. The language of the opinion is inconsistent with the idea that the court intended that exchange value should be accepted as the determining factor. The market value of all the stock and bonds which represent a given property show the market value or exchange value of that property. The court said that this was to be considered, but that the weight to be given it was only such as was just and right in each case.

One reason why exchange value cannot be safely accepted as a controlling factor in fixing the base amount upon which to compute a return has just been indicated. If the charges have been excessive, they tend to give an excessive exchange value. On the other hand, unforeseen difficulties of construction may be encountered and unavoidable losses incurred, so that the prop-

erty, when completed, may represent twice the actual investment of another property serving some other community of equal size. The earning capacity, and therefore the exchange value, of those properties will be approximately the same, but it would be a hard rule of law that the more expensive property might not, if it could, earn a return on its full cost to the owners, even though such cost greatly exceeded what the property could be sold for.

It is not market or exchange value any more than the original cost, or the reproduction cost, or the capitalization of the property that is to be taken as a measure for earnings. All are to be considered, and a base value adopted that shall be fair alike to the owners of the property and to the public. There can be no mathematical formula to govern. The fixing of such fair value is, and must always be, an act of judgment to be exercised by the officials intrusted with the powers of government to that end. But the exercise of that judgment is subject to judicial review, and the value fixed in any case may be set aside if it appears that due weight has not been attached to those evidences of value which justly ought to be considered.

#### MOST WEIGHT HAS BEEN GIVEN TO REPRODUCTION COST

In attempting to follow the law laid down by the court in *Smyth vs. Ames*, commissions appear to have given most weight to evidence of the cost of reproduction. The reason for this may lie partially in the fact that such evidence can always be secured, whereas evidence as to original cost is often difficult to produce. I believe, however, that the reason lies principally in the fact that it has accorded with our generally accepted notions of justice to say that the owner of a property devoted to public use should be permitted to receive a return upon an amount equal to what it would cost to reproduce that property if it should be withdrawn from public service.

Along with this idea another has been almost universally held. It is that the owner ought at least to be allowed a return upon the full amount of his investment. It is questioned by some who would establish the cost of reproduction of physical properties as the sole measure of value for rate purposes, upon the ground that if the owner is to gain through the increase in unit costs and land values he should bear the risk of loss through decrease in such costs and values. And, of course, that is logical.

In *Smyth vs. Ames* there is no suggestion of the consideration of preliminary and development costs incurred by the owners in establishing and developing the business connected with the property to be valued. In condemnation cases, however, the courts have made it clear that, in valuing a property taken, allowance must be made for the element of value inhering in the property by reason of the established business which it is doing. For a long time it was urgently insisted by the owners and representatives of public service properties that the same rule applied in the valuation of such properties for rate purposes. The commissions seem to have been impressed with this contention, and, in one way and another, to have endeavored to make their decisions in valuation cases conform to the rule as laid down in the *National Water Works* case (62 Fed. 853) and the *Omaha* case (218 U. S. 180). Still several commissions frankly refused to make any allowance for going value, and others made wholly inadequate allowances, assuming the same to have been intended to cover the substantial expenditures ordinarily represented by the cost of establishing the business on a paying basis. This attitude on the part of commissions was due probably to the facts that the costs of establishing a business have not been well understood, and



that it consequently has seemed to the commissions not just that substantial allowances should be made on account of business which appeared to be the result merely of a public demand for service.

#### COMMISSIONERS AND PUBLIC OPINION

It must always be remembered that public service commissioners are very human folk. They know that the offices they hold were created to protect the public from the supposed danger of overcharges or of neglect of duty on the part of public service corporations. They naturally have no desire to be considered conspicuously unfit to occupy those offices. They do not desire to be considered by the public either as biased in favor of the corporations, or as well intentioned persons whom it is very easy to impose upon. This is as it should be. If they were indifferent to public opinion they would be unfit for their offices, for they can be useful only so long as the public has confidence in them. They probably do more good in the line of promoting an understanding upon the part of the public of what it is reasonable to expect from the corporations, and on the part of the corporations of what it is reasonable for the public to expect, than by the exercise of their powers to make regulatory orders. It is, therefore, in the highest degree to be desired that the decisions which they may make should be based upon evidence which the public can understand.

Few commissions care to issue a report in substance like the following:

We have spent many months investigating the proposed rate increase. We have inspected all the physical property of the company which we can find, and have carefully estimated the cost of reproducing the same; we have made due allowance for omissions which may have occurred, for overhead costs and for working capital. We have determined the net income and have allowed a deduction for depreciation greater than the company has itself ever seen fit to set aside for that purpose, and still we find the balance of income remaining sufficient to pay a fair rate of return upon the value of all the property we could find, with the allowances we have made. This would lead us to forbid the proposed increase, but for the fact that the company at the hearing produced the evidence of an engineer of very high standing, who testified that it was his opinion that the fact that the railroad is a going concern, having an established business, with patrons who ride, gives it an intangible element of value, commonly called going value, which is equal to one-third of the value of the physical property. He also testified that in his opinion the company must have incurred a cost in securing the business equal to his estimate of its value. Upon consideration of this evidence we have added to the value of physical property one-third of its amount. This gives us a total value so large that we find the existing rates to be insufficient to yield a fair return. The proposed increase must, accordingly, be allowed.

The commissioners know that the public, if no costs are shown, will not easily understand why the fact that they ride upon the street railway should be treated as a reason for increasing the fares they are called upon to pay, if the company is already earning enough to make a reasonable return upon the value of all the property the commission can find. It is in accordance with commonly accepted ideas of justice that the company should have a return upon what it contributes to the service of the public, and it is contrary to those ideas that a company enjoying a monopoly should be allowed a return upon the capitalized value of the demand of the public service. It is to be expected that commissioners, being no different than other people, will be affected by these ideas commonly held by the communities in which they serve, and will feel little disposed to make much allowance for going value when nothing except opinion evidence is offered in support of the claims therefor. They do not question that established business adds very materially to the exchange value of any property,

but they are not satisfied that considerations of justice require that such increased exchange value should be taken as the measure of the company's rates.

#### BASING GOING VALUE ON THE COST OF BUSINESS

Now, if instead of basing the demand for an allowance for going value upon the fact that established business is worth money to the corporation, the demand for such allowance is based upon the fact that the business has cost money to the corporation, the result will be very different. If it can be shown by proof of actual costs that the business represents investment by the owners, just as truly as the physical property does, the commissioners and the public will concede that considerations of justice require an allowance therefor.

Proof of this sort must be given by the accountants. It requires careful and laborious work. But, if it is necessary as a part of any rate case to establish a substantial going value, a thorough review of the entire financial history of the corporation should be made. Exhibits should be prepared and presented showing: (1) All expenditures made for the purpose of building up the business of the company, and not paid as operating expenses out of revenues. (2) All expenditures or losses made during the history of the property, not paid out of earnings, and not reflected in the reproduction cost of physical properties covered by the inventory. Losses resulting from washouts, floods or other acts of God, or from sudden changes in the equipment demanded by the public, are a part of these expenditures. When they have occurred, are not attributable to the fault of the company and have not been recouped, they ought to be considered as expenditures made on behalf of the community, and given due weight, the same as existing property. Otherwise such losses, more or less of which are certain to occur in the history of any large property, could never be recouped. (3) Such deficiency of dividends below a fair return as the company appears to have suffered during its history, together with interest thereon to the date of the hearing. The amounts shown by these exhibits may not be accepted by the commission as the measure of the going value. They will, however, inevitably receive substantial weight, so generally conceded is it that actual sacrifices made in supplying public service ought to be required.

If there has been no deficiency of dividends, but there is accrued depreciation unprovided for by any depreciation reserve, an exhibit should also be made showing that the dividends paid during the history of the company have not exceeded a fair average return for the whole period, if such be the fact. If this is demonstrated to the satisfaction of the commission, then, in justice to the company, no account ought to be taken of accrued depreciation—or more accurately speaking, the accrued depreciation ought to be regarded as a part of the cost of establishing the business of the company, and a weight attributed to the intangibles on that account sufficient to offset the accrued depreciation. This principle was very clearly recognized by the Massachusetts commission in the Middlesex & Boston case (Mass. P. S. C. Reports, 1914, page 99), and by the New Hampshire commission in the Manchester case (N. H. P. S. C. Reports, Vol. V.).

If instead of depending upon opinion evidence to secure adequate allowance for going value, the companies will present to the commissions proof from their own accounts of the actual investment which such going value represents to their stockholders, I believe that instead of either being denied any allowance, or of receiving allowances which are merely nominal, they will generally receive allowances which will be full and ade-



quate. The public service commissioners throughout the country, speaking generally, are a body of men of substantial ability, who are very earnestly endeavoring to work out the problems of public regulation in a way that will result in full justice to the public and to those who have invested their money in the service of the public. The utilities will ordinarily get just treatment at their hands if evidence is presented which gives them a full knowledge of all the facts. This knowledge with regard to the so-called going value element can only be given by the accountants.

#### GOING VALUE NOT GRANTED WITHOUT PROOF

If the investments represented by the intangible elements of value before referred to are placed before the commissions, and proper allowances are not made, the record will then be in such shape that the courts can correct any failure of the commissions to do justice. This is not true where the going value claim is rested upon opinion evidence instead of upon proved facts. To illustrate this I want to refer to three court decisions.

The first was the last decided, *Des Moines Gas Company vs. Des Moines* (238 U. S. 153). In that case Judge Sloan, who sat as master, in the first draft of his report to the court valued the physical property at the cost of reproduction less depreciation, and added an item of \$300,000, as "its worth over and above its physical value, and more than a plant would be worth that had to develop its business." In this item, it was said, "no interest during construction is allowed, nor anything which is included in the 'overhead charges,' which are part of the physical value."

Before the final report was filed, the United States Supreme Court handed down the decision in the *Cedar Rapids* case, and this caused Judge Sloan to eliminate the item of going value, leaving his report as it otherwise stood, with the plant appraised merely at the amount of its reproduction cost less depreciation. "This value," the master said, "is reckoned upon the fact that the plant was in 'successful operation'—otherwise its value would be much less. The 'going value' is that enhancement which results from a well-developed and paying business." With the "going value" item eliminated the income was found to be sufficient so that the rates prescribed by the ordinance, which were under consideration, were not confiscatory. If the going value item had been included, the rates would have been found confiscatory. The case was taken to the United States Supreme Court, and that court sustained Judge Sloan's valuation.

Until this decision was made, there was a confident expectation upon the part of many able attorneys that when the question involved came squarely before the court it would hold that attached business must be appraised at its financial worth or value, using value in the sense of "exchange value." But in the *Des Moines* case the question was squarely before the court, and an entire disallowance of going value was sustained. The decision, however, went upon the ground that the proofs did not show unrequited losses, rather than upon the ground that unrequited losses might be disregarded. The court said:

That there is an element of value in an assembled and established plant doing business and earning money over one not thus advanced is self-evident. This element is a property right, and should be considered in determining the value of the property upon which the owner has a right to make a fair return. \* \* \* Included in going value \* \* \* is the investment necessary to \* \* \* establishing the business. \* \* \* In this case \* \* \* the inception cost of establishing \* \* \* a going concern has long since been incurred. \* \* \* For aught that appears in this record, these expenses may have been already compensated in rates charged and collected under former ordinances. It is not to be presumed, without proof, that a

company is under the necessity of making up losses and expenditures incident to the experimental stage of its business.

#### COSTS PROVED—GOING VALUE ALLOWED

I will now refer to two cases where proofs of these costs were supplied, and where the commissions were reversed for a failure to make allowance for going value. One of those decisions was rendered in the new and supposedly somewhat radical state of Oklahoma; the other in the citadel of conservatism, New York.

In *Pioneer Telephone & Telegraph Company vs. Westenhaver* (29 Oklahoma 429, 30 L. R. A. [N. S.] 1209) decided Jan. 10, 1911, it appeared from the evidence produced before the commission that for several years the earnings of the company were insufficient to provide for depreciation, or to pay dividends. The commission, however, had made no going value allowance. The court said:

Few industries \* \* \* can be made self-sustaining from the first day of their operation. \* \* \* During the time of development there is a loss of money actually expended and of dividends upon the property invested. How shall this be taken care of? \* \* \* The public cannot expect as a business proposition, or demand as a legal right, that this loss shall be borne by him who furnishes the service.

The court held, therefore, that the use of the property and the expenditures made during the non-expense-paying and non-dividend-paying period should be treated as an element of value of the property upon which fair returns should be allowed.

The next case is *People vs. Wilcox* (210 N. Y., 479, 51 L. R. A. [N. S.] 1) decided March 24, 1914. This was a rate case before the New York Public Service Commission for the First District. The commission fixed the value of the property by ascertaining the cost of reproduction less accrued depreciation. Preliminary and development expenses prior to operation were included, but no allowance was made for the cost of developing the business. The books covering much of the history of the company were not available, but it was shown that from the beginning of the business in 1889 until 1907 no dividends were paid. Opinion evidence was also offered as to the cost of building up the business.

The Supreme Court and the Court of Appeals held that allowance for going value, in addition to the physical value, must be made. The following is from the opinion of the Court of Appeals:

It takes time to put a new enterprise of any magnitude on its feet, after the construction work has been finished. Mistakes of construction have to be corrected. Substitutions have to be made. Economies have to be studied. Experiments have to be made, which sometimes turn out to be useless. An organization has to be perfected. Business has to be solicited and advertised for. In the case of a gas company, gratuitous work has to be done, such as selling appliances at less than fair profit, and demonstrating new devices, to induce consumption of gas and to educate the public up to the maximum point of consumption. None of those things is reflected in the value of the physical property, unless, of course, exchange value to be taken, which is not admissible in a rate case. The company starts out with the "bare bones" of the plant. \* \* \* By the expenditure of time, labor and money, it coördinates those bones into an efficient working organism, and acquires a paying business. The proper and reasonable cost of doing that, whether included in operating expenses or not, is as much a part of the investment of the company as the cost of the physical property.

The investors in a new enterprise have to be satisfied as a rule with meager or no returns while the business is being built up. In a business subject only to the natural laws of trade, they expect to make up for the early lean years by large profits later. In a business classified among public callings the rate-making power must allow for the losses during the lean years, or their rate will be confiscatory, and, of course, will drive investors from the field.

If a deficiency in the fair return in the early years was due to losses or expenditures which were reasonably neces-



sary and proper in developing efficiency and economy of operation, and in establishing a business, it should be made up by the returns in later years. If there was a fair return from the start, the corporation has received all it was entitled to, irrespective of how much of the earnings may have been diverted to the building up of the business.

\* \* \* If the shareholders have been deprived of a fair return on their investment because of the time and expense reasonably and properly required to build up the business, they have, to the extent of that deprivation, added to their original investment, and are entitled to a return upon it. If, however, a fair return in addition to the expense of building up the business has been earned from the start, the public, not the shareholders, have paid the development expenses. We are dealing, not with exchange values, but with the value upon which the company is entitled to earn a return. \* \* \* The term is not important. The point is that in some manner and under some appropriate heading a due allowance must be made for the investment in those elements. No inflexible rule will in the long run be just both to the public and the corporation. The right to limit the corporation to a fair return fixed by public authority necessarily involves the correlative right in the corporation to be assured of that fair return during all the time that its capital is employed in the public service.

#### ACCEPT THE SITUATION AND GET THE FACTS

This is one of the best discussions of going value to be found in the books. While opinion evidence was offered, and the court held that the same was proper, it clearly rested its decision on the fact that early unrecovered losses were shown. This case was decided March 24, 1914, and was cited upon the briefs of counsel in the Des Moines case, which was decided June 14, 1915. The Des Moines case is not in conflict with the Oklahoma and New York cases. In these cases, the fact that there were early unrecovered losses appears to have been shown by evidence introduced. In the Des Moines case it appears that the gas company depended not upon evidence of facts, but upon opinion evidence alone. The holding of the court was that because it was not shown in the record that the inevitable costs of developing the business had not been recouped, the failure to make allowance for going value could not be held confiscatory.

The refusal of the United States Supreme Court to give to the term "value," as used in rate cases, the same meaning as "exchange value," may or may not be regrettable. As to that I express no opinion now, because that is beside the point of my present remarks. Some companies may have been so fortunate that no unrecovered losses or expenditures can be shown. To them the present state of the law may seem to be unfortunate. So substantial, however, are the usual costs of establishing a business, especially when dividends foregone are included in those costs, as they properly should be, that I believe most companies, if their accounts are properly studied and analyzed, will be able to show with certainty that they are entitled to receive substantial allowances for going value.

Whether we approve or not of the present state of the law upon this subject is really of little consequence. The law, for all practical purposes, is what the courts say it is. It is never wise to refuse to adapt ourselves to any situation which we find actually existing. In the preparation and presentation of rate cases, we must adapt our proofs to the requirements of the courts, if we expect the companies we represent to receive the protection of the courts in the enjoyment of their constitutional rights, we may believe that the courts ought to base their allowance for going value on the increased worth in money which attached business gives to plant. This would obviate the necessity for an analysis of the early accounts of the company. But in the face of the decision in the Des Moines case, to the effect that the going value element may be wholly disregarded in a rate case when it is not proved that, in the actual experience of the property valued, the cost of establishing

the business has not been recouped, it requires optimism in the highest degree to expect that public service commissions will generally make such allowance when such proofs are lacking.

#### TRANSFERRING GOING VALUE BY SALE

There is much that remains to be made clear by the courts concerning this subject. For example, there are decisions of commissions and courts which hold, or indicate, that no weight should be attributed to losses and costs during the development period, provided the property in the meantime has changed hands, and provided it is not necessary to consider such losses and costs in order to establish a value equal to the full investment of the present owners. But I do not think this can be the law. If a property has been established as a going concern at an unexpectedly large but necessary expense to the owners, so that a reasonable return cannot possibly be earned upon the full investment, but there is a possibility that business may some time increase to a point where such return can be earned, it does not seem just to say to the owner: "You may yourself have a return upon your full investment, but you may not convey the right to receive that return to any purchaser unless he will pay as a purchase price the full investment."

It is self-evident that a property with the right, if possible, to earn a return on \$400,000 is worth more than the same property with the right to earn a return on only \$350,000. If the physical value of the property is \$300,000, and the intangible value is \$100,000, but \$300,000 is all the property can earn a return upon, a purchaser may be willing to pay \$350,000, provided he can acquire the right to receive a return on the full \$400,000, when the business becomes sufficient to enable him to earn such return. It is certain, however, that he will not pay \$350,000 if he can not now earn a return upon that amount, and will never in any event be permitted to earn on more than that amount.

To say that a man may not transfer his property to another for such price as is satisfactory to him, with all of the attributes of value which it has in his possession, is partially to confiscate the property. That the courts will ultimately so recognize, I believe. Of course the price paid for the property by the present owner is entitled to consideration in determining the value for rate purposes, but it ought to be considered in connection with the entire investment represented by the enterprise by whomsoever that investment was made.

#### DUTIES OF PARTIES IN RATE CASES

The problem always before the commission in a rate case is to determine what is just to the company and to the public in view of the investments in the enterprise, and of all the relevant facts affecting the particular case. If it is just that substantial allowances shall be made on account of intangible elements of value, it is the duty of the company to aid the commission by a showing of facts which will enable the commission intelligently to determine what that allowance ought to be. In *Knoxville vs. Knoxville Water Company* (212 U. S. 1) the United States Supreme Court stated the duty resting upon the commission and upon the company as follows:

Regulation of public service corporations \* \* \* is a delicate and dangerous function, and ought to be exercised with a keen sense of justice on the part of the regulating body, met by a frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear. The legislatures and subordinate bodies, to whom the legislative power has been delegated, ought to do their part. \* \* \* On the other hand, the companies to be regulated will find it to their lasting interest to furnish freely the information upon which a just regulation can be based.





F. W. HILD



T. S. WHEELWRIGHT

## Symposium on Company Publications

The Authors Discuss the Value of the Company Publication as a Medium for Improving Public Relations and for Creating Initiative Among Employees—Suggestions for Standardization Under a General Editor.

At the Transportation & Traffic Association session on Thursday, Oct. 12, F. W. Hild, T. S. Wheelwright, Leake Carraway and James H. Braden delivered papers on the general subject of "Company Publications" in which they outlined the editorial policy essential for the success of such publications, their value as a means of creating better public relations and the opportunity they afford employees for suggesting improvements in service. The interest of the public, too, is evidenced by the fact that the papers placed in cars and waiting rooms for general distribution are quickly disposed of.



LEAKE CARRAWAY



J. H. BRADEN

### Use and Value of Company Publications\*

By F. W. HILD

General Manager Denver (Col.) Tramway

**I**N the electric railway field company publications may be divided into three classes: (1) "Good-will" periodicals, intended primarily to promote among the public good relations and better understanding of the utility problems, and, secondarily, to advertise the company's business. (2) House organs, intended for the employees and the investors of the company. (3) Traffic and safety promotion publications, such as booklets, folders, leaflets, time cards, dash signs and car posters.

As between the first and second the writer is inclined to give preference to the "good-will" periodical, as that will circulate among the employees as well as the public. If the publicity appropriation will permit a house organ, however, its publication is strongly urged as a means of greatly improving and promoting beneficial relations between the company and the employees, and also of interesting the more prominent stockholders.

#### POWER OF PUBLIC OPINION SHOULD BE MORE APPRECIATED

Many of the difficulties which confront utilities would be much less if those who direct and control the larger business interests appreciated more keenly the tremendous power and value of public opinion, and would keep more clearly in mind two fundamental facts: First, that the legislator, whether municipal, county, state or national, is elected to execute the will of the people and not merely his own individual ideas, and, second, that the press rarely if ever initiated any great movement.

It has been and is what it should be, a mirror reflecting and developing public opinion.

Just consider for a moment what might be taken as the typical procedure of the average leader in corporate endeavor as it has come to pass in recent years. Let us assume that a movement of some kind adversely affecting the interests of a public utility corporation has begun to gather headway. The leader of this company, let us call him the executive, calls in his staff, presents to them the problem, and thereby brings trained minds to bear upon its analysis. In due time a solution is suggested to the executive—nine times out of ten the correct solution, and often meaning that some legislation may be necessary or must be opposed. The executive then goes to the legislator, discusses the situation quite fully and explains the proposed solution of the problem, and nine times out of ten the legislator will agree as to the correctness of the proposed remedy. The executive, knowing that legislation is a matter of routine and might be helped along if the newspapers would take hold as he wished, then proceeds to visit the editor, who also nine times out of ten agrees with him. But, contrary to the executive's hopes, nothing happens, or when it does happen, the legislation is usually adverse and the press comment is non-committal or adverse. The executive then takes his case to the court, and is sustained eight times out of ten, or was until recently. Hence the executive has got into the attitude of saying, when anything of this sort occurs nowadays: "Oh, what's the use? We will have to settle it in the courts anyway." But even the courts in these days are becoming more responsive to public opinion than to strict and legal interpretation of the facts and justice.

The executive himself is primarily at fault for this situation. He has lost sight of the fact that in the last analysis the public finally decides all the important questions, and if the decision be wrong it is because the

\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.



public is acting upon misinformation or insufficient information, for the writer is firmly convinced of the absolute and fundamental fair-mindedness of the American people. The executive has failed to appreciate that it is necessary to acquaint the public as well as the individual legislator and the journalist with most if not all of the facts pertaining to the utility's problem.

#### PROPER AND INTELLIGENT PUBLICITY IS NEEDED

The remedy is unquestionably proper and intelligent publicity, and this resolves itself into the question of ways and means. Proper and intelligent publicity as a means of thoroughly informing the public of the problems and difficulties of the executive's business is just as necessary as the careful planning of power-house construction, the operation and schedules of cars, the analysis and study of electric rates, gas rates, services, and so on.

The writer's study of this problem has led him to the conclusion that the transportation companies have available to them the most superior and effective means for reaching the public with their arguments that exist—namely, the cars, depots, waiting-rooms, etc.—and that a small pamphlet distributed periodically on the cars will be read by the public and have a splendid circulation. Such a pamphlet should not exceed four pages, and the size should be small in order that the subject matter may be perused within the duration of a street car ride. Furthermore, the public will more readily absorb and digest the rather dry and heavy matter which must necessarily form a presentation of the facts relating to utility economics, provided it be brightened and accompanied by semi-humorous matter. The "good-will" periodical should carry no paid advertisements whatsoever.

#### HOUSE ORGANS AND OTHER PUBLICATIONS

The purposes of the house organ are as follows:

1. To weld together the work and interests of employees.
2. To increase their ambition and improve the efficiency and spirit with which they do their work.
3. To better the relationship between the company and the employees by telling them about little known and imperfectly understood departments of the company and conditions that confront it.
4. To introduce employees to one another and to the management.
5. To prevent misunderstandings by explaining beforehand.
6. To carry public praise for employees and practical instruction for men in operating, selling and shop departments.
7. To give employees personal and company news.

This is a field in which the American Electric Railway Association, by co-operation among its members, can bring about quick, tangible and quite substantial benefits, not the least of which would be distinct monetary savings, not very large, to be sure, but in many cases enough to pay the cost of membership dues in the association.

Observation of about twenty house organs shows a great variety in size, appearance, subject matter and type. Only six are snappily illustrated. The covers of only three are attractive and changed monthly, among the best of which is the *B. R. T. Monthly*. The typographical make-up and appearance of all excepting this one, the *Railwayman* of Kansas City and the *Interborough Bulletin* and the *New York Railways Employees' Magazine*,

are between "just fair" and "very poor." Only four contain inspirational articles. Only nine contain educational matter, and but four of the nine lay appreciable stress on this.

In general the house organ should be made attractive in order to appeal to employees. It should have the attention of a trained editor or writer, who has both the time and enthusiasm to make the magazine worth the full cost to the company.

Of the third class of company publications, that is, those booklets, folders, pamphlets, time cards, dash signs, posters, etc., intended to promote traffic and safety-first, there are some splendid examples of the advertising man's technique and the printer's art, but in the majority of cases this class of electric railway printed matter reflects conscientious though obviously painful effort of men who clearly know a whole lot more about schedules, cars, transfers and other important features of operation than about salesmanship or the art of creating in the mind of the patron the desire to utilize the service offered by the company.

The possibilities which are to be found in the proper development of company publications have led me to request J. C. Davidson, publicity agent of the Denver Tramway, to prepare the following remarks setting forth some definite suggestions on syndicating material for company house organs. At the same time I would suggest that the possibility of syndicating the claim department and safety-first printed matter be carefully studied and investigated.

Mr. Davidson tells me that there are two reasons for standardizing certain features of electric railway house organs. The first is one of economy, and the second is one of more efficiency in the use of such publications. This conclusion that standardization is desirable and possible has been reached through recent efforts to improve our own house organ, the *Tramway Bulletin*, and to make the money spent on it secure the fullest possible benefit. We first studied, month after month, all the house organs we could find that were published by electric railways. From that we progressed to a thorough study of what could be done with the *Tramway Bulletin*, and the many economies and improvements which we found to be practicable led us to suggest that the association appoint a committee on standardization of company publications, which could, through similar studies, recommend standardization for house organs alone that would result in considerable savings and betterments for every individual company which co-operated in the plan.

#### POSSIBLE LINES OF STANDARDIZATION

For example, such a committee could study and recommend a standard for: (1) Page size for company publications; (2) style of make-up for standard publications; (3) standard series of cover designs for all; (4) typographical style and arrangement, and (5) ideal contents, so balanced that proper space will be allotted to inspirational, educational and news stories.

The committee might work out a plan for drawing, from the best sources among the companies, good inspirational and educational articles that would apply in all electric railway companies. These should go, perhaps, to a central editor. This central editor should have charge of the work of syndicating the cover designs and special articles. These would be set up in the standard style recommended by the committee, and proofs of the matter would be sent to all company publications participating in the standardized plan. Editors of company publications would go over the proofs, select the articles that they wished to run in the next issue of their magazine, and order electrotypes of those articles and of the cover. Because of the standard page size,



standard make-ups and standard typographical style and arrangement, this "boiler plate" from the central editor would fit in and harmonize exactly with the remainder of the pages in the magazine.

#### PLAN WOULD FACILITATE LAYING OUT AN ISSUE

This would immediately have the effect of raising the quality of the contents of every company publication and of making possible a full realization of everything which a company magazine can be made to do. Instead of being hard pressed for material and clipping and pasting haphazardly anything that "looks good," the editor of each company publication would be able to sit down the first of the month and plan his coming magazine something after this fashion, which is given for a twenty-page publication (9 in. x 12 in.) merely to illustrate roughly the ideas offered:

- Inspirational story in semi-fiction form. Furnished by central editor in plate form with illustrations included. ....2 pages
- Leading local articles of month, educational in nature and pertaining to work, rules, selling plans or departmental activity. ....2 pages
- A full-page, large-type talk to the company's employees by the president, general manager or sales manager, to promote good-will. ....1 page
- Inspirational article or description of how some top-notch street railway does the things every company's employees do. Furnished by central editor, illustrated. ....1 page
- Explanation and reiteration of rules or of forthcoming changes by superintendent of transportation or heads of other departments handling large number of men. ....1 page
- Notes of new ideas, methods of progress in electric railway world which would be of general interest among all companies and which would be calculated to make employees think. Furnished by central editor, illustrated. ....1 page
- "Question Box" regarding the various phases of work of the transportation department or shops or some other group large enough to justify publication. Many of these questions may be general enough to be furnished from the central editor, but this matter will be furnished in script and not in plates, so that the local editor can add manufactured questions to suit local conditions. All these questions and answers will have to be created entirely by the editors for probably a year before the employees get the habit of sending in their own questions...1 page
- Courtesy, safety, transfer, shop or other general articles. Furnished by central editor. ....4 pages
- News notes, articles by local company's men, personal notes, athletic notes, association or club notes, advertising, etc., plus index and cover. ....6 pages
- Inspirational article or story. Furnished by central editor. ....1 page

This plan will apply as well and as economically to a magazine of eight pages as to one of forty. The central editor should find it necessary to devote but very little time each day to his end of the job. In other words, it is not necessary to have a high-priced man devoting all his time to this work. He should be reimbursed for stenographic time used in corresponding with contributors and with company editors, and for his own time in editing contributions according to the needs of his clients and in overseeing the setting up, illustrating and ordering of material. The printing of any magazine, naturally, will be done in the local company's city.

The practical value of these suggestions can be better appreciated when the actual facts, figures and present publications as issued are studied. Details have been left out of this brief paper because the purpose of the writer is to suggest only the opportunity offered by the idea and to outline a small and undeveloped field in which the American Electric Railway Association might make itself very helpful to its members.

## Worth of Company Publications\*

By T. S. WHEELWRIGHT

President Virginia Railway & Power Company  
Richmond, Va.

**M**ORE than ten years ago there was published and distributed on the cars in Norfolk, Va., a small bulletin resembling in its essential features the street railway publications of to-day. While hardly more than a simple folder, it was the prototype of the numerous public utility periodicals now published in this country and Canada. The Norfolk publication was short-lived, and nothing further in this direction was attempted by the Virginia Railway & Power Company until early in 1915, when it began the simultaneous publication in Norfolk and Richmond, respectively, of *Public Service Chat* and *Public Service News*. Both of these papers are published bi-weekly and have appeared continuously since March, 1915.

#### PAPERS ARE ADDRESSED TO PUBLIC

It is from our experience with these two publications that I base my observations on the use and value of company periodicals. *Public Service Chat* and *Public Service News* are eight-page papers bound in magazine form. They are distributed on the cars through metal holders placed immediately above the push-buttons at alternate seats.

These papers are addressed primarily to the traveling public. Indirectly only do they reach the employees. Other companies make use of publications addressed directly to their employees and dealing with subjects immediately related to their work and welfare. There is, however, a fairly well-defined distinction between the two classes of company publications. They require different treatment and different subject matter. Material that would be entirely appropriate for publication within the family would in many cases be undesirable for general distribution among the public. This company has not so far undertaken the publication of an employees' paper, although it has already felt the need of some such medium. A beginning has been made recently by the formation of a general safety committee and sub-committees in the several departments throughout the system, and the installation of a safety-bulletin service in which bulletin boards located at the shops, carhouses, terminals, etc., are used for the display of posters illustrating typical accidents and methods of prevention.

The street car papers, however, are used for the publication of news matter dealing with the activities of the employees' relief association, Y. M. C. A., picnic and sports. In the Richmond paper, *Public Service News*, a regular department is devoted to communications from patrons commending individual employees for praiseworthy conduct in connection with the railway service. To this extent the street car papers are also employee periodicals.

#### MAKE-UP IS BASED ON CERTAIN PRINCIPLES

In the make-up of the paper we follow certain well-defined lines. We carry no advertising. To do so, we believe, would divide the interest. It might needlessly antagonize private enterprises engaged in the various branches of the advertising business who would resent the intrusion of a new advertising medium controlling a "closed" advertising field, and might be construed to be in violation of our car advertising contracts. We religiously avoid recrimination of any kind, believing that sharp attacks on governmental bodies or individ-

\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.



uals are productive of more harm than good, and that a continuous setting forth of our argument in dispassionate, unoffending language will in the end prove the wisest policy.

In every issue we carry a reasonable amount of light material—jokes, anecdotes, photographs, illustrations and epigrams. Our aim is to make the paper readable. The most common mistake of company periodicals designed for public reading, in my opinion, is the cramming of the publications with heavy statistical matter which the car-rider finds it difficult to digest. Since a printed message is valueless unless it is read, too much care cannot be taken to make the paper attractive and interesting. Once the passenger is attracted enough by the "light" features to look for recurring issues; once he contracts the habit of reaching up to the metal holder for the new numbers as fast as they make their appearance on the cars, the battle is won. It will be only a matter of time before he will read also the prepared articles and the arguments which the company is interested in setting before the public. It is the well-established newspaper policy of placing advertising next to reading matter applied to street car papers.

#### PUBLICATION PERFORMS VALUABLE FUNCTION

Edited along these lines, the company publication performs a valuable function. It is the natural vehicle for special articles and arguments which can find admittance to newspaper columns only as paid advertising. It brings the message to the reader's notice when his attention is not distracted by competitive advertisements and news matter, as is the case when he is reading the daily paper. In offering a forum for the discussion of grievances, it advertises effectively the company's disposition to deal squarely and openly with its customers—an impression that cannot be fostered too assiduously. Properly edited, it personifies the company and accents its human and responsive character in a way that is not possible through the employment of any other means.

#### COST OF PUBLISHING PERIODICALS IS AN INVESTMENT IN GOOD-WILL

From the beginning we looked upon the cost of publishing our street railway periodicals as an investment in good-will. We expected no immediate, direct returns. The value of the public's good-will lies in the fact that it is a plant of slow growth and slow death. Years of persistent publicity backed up by years of square-dealing are required to bring it to maturity. Once attained, the public's confidence is not easily shaken and stands as a bulwark between the company and malicious efforts to misrepresent it in its relations with the public.

Have the publications paid as an investment in good-will? Are company publications on firm ground as fosterers of a better understanding between the corporation and its patrons? Do they justify their cost? To these questions, looking at the matter in the light of our own experience, I answer in the affirmative. Many signs strengthen me in this belief. The publications are readily absorbed by the traveling public. In Richmond we distribute 25,000 copies of each issue of *Public Service News*, and the edition is exhausted three or four days before the following issue appears. Observation has shown that the papers are eagerly read. They enjoy the rare advantage of finding the passenger in a receptive mood—in a ten or twenty-minute period when he has nothing to do and is willing to be instructed and amused.

Copies of each issue are mailed to the councilmen,

city officers, clubs, lodges and associations maintaining reading rooms, and to the managing editors of the local newspapers. Frequently the newspapers make use of the material in the preparation of news stories, and occasionally the subject matter of the street car periodicals has supplied editorial writers of the local daily papers with material or inspiration for commendatory editorials.

#### COMMUNICATIONS FROM PATRONS SHOW THAT PAPERS ARE ATTRACTING NOTICE

That the material carried by the street car papers is attracting notice is evidenced by the increasing number of communications received from patrons. Allowing for "crank" letters, communications from persons who make a practice of "writing to the editor," and notes commending individual trainmen, written by "inspired" personal friends, there is a growing number of serious communications from persons really interested in some phase of the service problem, who are encouraged through the street car publication to establish a valuable personal relationship with the company. Voluntary expressions of approval from experienced business and advertising men strengthen us in the belief that the street car publications are performing a useful service. Invariably, these make the statement that the little street car paper is a "friend-maker," that it establishes a genuine personal link between the company and the patron.

Most of the street railway publications are still less than three years old. A few are in their third volumes and not more than two or three are veterans of four years' standing. It is too early, therefore, to pass final judgment on their efficacy. No one who is familiar with the years of relentless repetition that are necessary for the popularizing of a trade-mark, for the up-setting of a deep-rooted conception, for the dissipation of long-entertained prejudices, would expect a modest street car periodical to bring about over night the era of broad tolerance and sympathetic co-operation for which all public utility companies in this modern day are striving. The street car paper is only one of the several agencies upon which we must rely for this achievement.

#### FACTS WELL SERVED, TO APPEAL TO VARIED TASTES, ARE NEEDED

For publicity of any kind to accomplish any results it is essential that we have a genuine desire to state the facts, and that the information be so served as to appeal to the varied tastes of the readers. We must remember that the minds of our patrons are the products of a great variety of environments and there must be considerable and continual variety in the mental menu.

We must be careful to launch our subject in such manner and form as not to arouse that spirit of perversity or prejudice which might cause it to be rejected or opposed without consideration, thus rendering our further efforts of no avail. We must be careful always to avoid any suggestion of grouch or threat. These are the weapons of the weak and are only resorted to where the cause that is being upheld lacks both reason and justice.

Let us just tell the truth cheerfully and persistently, according willingly to the other fellow his right to pass judgment, and trust to the justice of our cause for the desired result. To the extent that we are prompted by a genuine desire to serve, just to this extent will our success in gaining public favor and confidence be measured. In short, we are at all times the masters of our own fate.



## Getting Out a Company Publication\*

By JAMES H. BRADEN

General Agent Northern Ohio Traction & Light Company,  
Akron, Ohio

**C**HIEFLY in the interest of improved public relations, the Northern Ohio Traction & Light Company issues twice each month its company publication, *The Traction Bulletin*. I say "chiefly" in the interest of better public relations, for there are other interests which we try faithfully to serve. These are the promotion of our safety-first work and the advancement of business through advertising.

### HOW THE PAPER WAS STARTED

It was only after a long period of doubt and hesitation that we launched *The Traction Bulletin* nearly three years ago. The chief motive back of the paper's beginning was the hope of correcting some impressions which were both false and unjust, and overcoming, if possible, some of the prejudice that had largely resulted from misinformation which had come to pass current without discount because the truth had never been presented. We chose to make our paper one of four pages because in the space so afforded we believed we could cover all the subjects it might be desirable to present in any one issue and not burden the reader. Moreover, we have aimed to keep our cost well within limits, and a four-page paper costs 30 per cent less than one of eight pages. For similar reasons we adopted a size of page which permits the paper to cut out of regular 28-in. x 42-in. stock with very little waste. This paper stock is known as "machine-finished book," and runs 50 lb. to the standard ream. It will take halftones nicely, and, of course, costs less than a finer grade, though at the same time it costs more than some goods which we might use but which are too cheap for the purpose. Our paper will always be taken as representative of the company, and we try to bear this in mind both as to the physical appearance of our printed messenger and as to its contents.

### CIRCULATION AND COST FIGURES

Our paper is issued twice each month only, instead of weekly. This was decided upon, in the first place, because the publication was somewhat of an experiment. We have continued on a bi-monthly basis not because we believe this to be equal to a weekly issue, but for the reason that the bi-monthly is all we have time to issue and do it well in our present organization. Our first issues were of 15,000 to 20,000 copies each, but before the first year was over we were printing 25,000 of each issue, and this year our editions are usually 30,000 copies—never less and sometimes more. We could distribute a greater number if we kept the little boxes or pockets in the cars filled for the entire two weeks or more between publication dates, but we would rather have the boxes empty at least a part of the time. It helps to maintain interest in the paper and leads patrons to notice the appearance of a new number.

Our original price for printing was \$2 per 1000. We agreed to furnish and do furnish two sets of cuts for each edition in which illustrations are used, as the printers run two-on in their press work. Time does not permit the electrotyping the forms, and two sets of type are obtained by casting each line twice on the type setting machine. Originally the paper stock, which our printers purchased in 2-ton or 3-ton lots, cost them 3.8

cents a pound, but now the price is 10.75 cents. We consented to meet the advance at the rate of actual increase to the printers.

The first boxes or pockets placed in our cars for the distribution of the bulletin, and bearing the invitation "Take One," were of cast aluminum. They cost 25 cents each in quantities of 200 at a time. Later we obtained and now use altogether a box of pressed sheet metal neatly painted in aluminum, and the words "Take One" lettered upon them in black. These cost us from 8 to 10 cents each. The painting and lettering is extra and is done in our own shops.

To sum up the cost question—we printed last year approximately 720,000 copies at a total cost of a little less than \$3,200—including a part of the salary of the general agent, who is the editor; a portion of his stenographer's salary, cuts, and the posters used in the car windows to call attention to each new issue. On the basis of 2 or 3 per cent for waste—that is, for copies left over in cars or for other reasons not reaching the hands of patrons—we placed in the hands of actual readers 700,000 papers at a cost of about \$4.50 per 1000.

### COMPARATIVELY LOW ADVERTISING COST

The cost of this work is extremely low as compared to the price paid by other advertisers. The big problem of every advertiser is to get his message to the possible customer. He uses the newspapers for general work but for concentrated effort he circularizes. And he must pay, on top of his cost for preparation and printing, \$12 per 1000 at the very least for stamps, envelopes, addressing and mailing. Furthermore, a large part of his expense is lost. The mails are so full of circular matter that even the best things often go to the waste basket unopened. For *The Traction Bulletin*, however, we are at practically no expense for distribution, and we know our message reaches our audience, because that audience takes the papers out of the little pockets in the cars without urging.

We have our say to our customers at the moment when they are ready or willing to hear us, while the general advertiser must hope to be heard when a score of other advertisers are at the same moment clamoring for attention. In the 700,000 copies of the bulletin we carried light, power and railway advertising worth a great deal to us—advertising which if done in the newspapers would have cost at least \$100 per month. Moreover, we were able to place announcements of new schedules, changes, etc., before our patrons in a way and place in which they could not miss them even though they did fail to see the newspaper announcements, which not infrequently is the case.

### HOW TO EDIT A COMPANY PAPER

A company publication is of little account unless we have something of interest to say. Moreover, we must be very careful and thoughtful as to what not to say. We are dealing with one of the most subtle and most tremendous powers known to mankind—the power of suggestion. If not properly handled, it may easily do more harm than good. A substantial citizen criticised *The Traction Bulletin* because we did not put enough red pepper and ginger in it. His remark emphasizes my point, for in most things we write about we must take great care to keep the pepper out, though there are times when we hit and hit hard. In the main our tone is that of good nature, kindness and sincerity—always that. We do not try to "put things over," as the street phrase goes. We do boost our good works with emphasis but never in a spirit of self-complacency. We aim for the truth always. We try to have a preponderance of new local matter in every issue. On matters

\*Abstract of a paper delivered before the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.



of real news importance we never try to beat the newspapers. If we have something we know they want, we send them advance proofs.

Simply talking with the general manager, the superintendent and department heads about work that is going forward and other matters that will make good material for the company paper, is a job which any reasonably bright reporter can handle. To know what not to print, however, and how to present the things which are printed, requires a greater training. In our own experience we have consigned to the grave yard more than one piece of careful composition which on first thought appeared decidedly worth while. We aim not to be clever but persuasive, not argumentative but true, admitting faults when we must present them as freely as we chronicle our virtues, mindful ever that under the best of circumstances, out of the cars and right in our offices, we may have done those things which we ought not to have done and have left undone those things which we ought to have done. We try to be instructive without being pedantic, and above all things and at all times we realize that a touch of human nature makes the whole world kin.

## Preparing and Publishing Company Publications\*

By LEAKE CARRAWAY

Director of Publicity Southern Pacific Company  
Charlotte, N.C.

THE subject of preparing and publishing company periodicals divides itself naturally into two general sections, the first concerning the actual gathering and writing of the data which goes into the publication, and the second, the printing and circulating of the finished product. It would be difficult to determine exactly which of these factors is of the more consequence and exerts the greater influence upon the employees of the company and the public at large.

### HANDLING DIVISION NEWS THROUGH REPORTERS

The first division of the subject may, in turn, be subdivided into sections dealing with the various interests to be served. For instance, there are in our company a number of interests involved, electric lighting, electric power, gas for illumination and power, street railways and a water system. To attempt to gather data covering these interests in the same way and manner and from the same people would, manifestly, be little short of foolishness. Therefore it is necessary to secure the co-operation of the employees in the various lines, to the end that they will assist in gathering the data which interests that particular department.

As a rule, however, the employees of a public utility company are not newspaper men by training or nature, and the data secured by them are, in the main, only the elemental facts upon which may be built an interesting "story." While the plan of appointing reporters on the various properties has not been abandoned, it is found to operate, in some instances, against full and free access to the editor on the part of the great mass of the employees. For this reason we visit each city and town operated by the Southern Public Utilities Company at least once each month, and more often when special occasions arise. On these visits we come in contact with a large percentage of the men in all the departments. We discuss with them not only matters of interest to the company and to themselves as employees but also matters of more personal import, and often the

most interesting articles of the month are developed in this manner.

### REPORTING MONTHLY RAILWAY MEETINGS

In each of the cities in which street railways are operated we attend a meeting in the form of a smoker or dinner, held on an average of once each month. At these meetings a program, arranged by the employees with the approval of the management, is put on; platform men discuss their troubles on the line, the car-house men discuss their problems and the men from other departments bring to this round-table all manner of subjects for discussion, with the result that discoveries of value to the street railways in the other three cities are made and passed along through the pages of the magazine. While these meetings are called for the primary purpose of getting the street railway men together, the employees of all other departments are invited and it is often the case that an employee in the accounting department gives or receives a suggestion that is worth the attention of the officers and employees of the entire system. The vehicle through which this goes to the employee-body is the magazine.

### OTHER TOPICS COVERED BY MAGAZINE

In addition to the foregoing sources of news the employees are invited and urged to write articles of interest for publication in the magazine. Some of these articles do not deal with the questions which confront public utilities in their primary form, but in every instance there is an indirect, and in some instances, a more effective appeal to the men for closer co-operation, greater loyalty, better living conditions and cleaner moral relations, which as a general rule are read with interest by the majority of the employees.

From time to time the pages of the magazine are thrown open to the operating officers for the discussion of matters in which both the employees and the public at large are interested. It is found that these communications or signed articles from officers are read carefully by the employees, and the public comes to a more nearly accurate estimate of the efforts of the company toward the ideal efficient service.

Official orders governing any feature of operation are given place in the magazine, and reports of new construction with drawings, photographs, maps or other illustrations are shown from time to time. New equipment is reproduced for the information of the public when it is put into service, and developments along any line are given all the space they will legitimately fill.

Employees who, by their unusual efficiency, come into notice are given public commendation, and wherever it is possible photographs of such employees are used. For example, in the case of a motorman who by co-ordinated head and hand work avoids what would doubtless have been a most serious accident, his photograph is reproduced to illustrate an article describing just how he was able to avoid this particular accident. This, read by the other employees of the company and by the public, results in every other employee keeping a watchful eye to windward in an effort to duplicate this act or to perform some other which will bring to him the commendation which has just been accorded his associate.

In addition to these intra-company data we invite communications from the public in the cities in which we operate, giving the boards of trade or chambers of commerce space to lay before the public matters of especial import. Ministers of the gospel occasionally prepare a sermon for public utility employees to be preached from their pulpit and later to be reproduced in the pages of the magazine. Public-spirited citizens

\*Abstract of a paper delivered before the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.



who desire to discuss any matter of general interest are invited to use the magazine, and in this manner the publication comes to be much more interesting and more generally read.

#### PRINTING AND CIRCULATING POINTS

Second not even to the type of matter used and the method of its preparation, is the printing of the publication. The best printer is the cheapest, when a publication for the employees of a public utilities company is to be published. There are those who hold that a printing department within the company is the proper method of handling the work, but it is our opinion, based upon long experience both in corporation and fraternal publicity, that a contract let to a reliable printer is far more satisfactory from every possible viewpoint. Better work for less money may be had by contracting with a printer whose equipment is capable of handling the job than in any other way.

Our "copy" goes to the printer in job lots, beginning soon after the issuing of the last magazine. By the thirtieth of the month 99 per cent of the copy for the following month's issue is in the hands of the printer and galley proofs have been taken. On the morning of the third of the month the conductors' efficiency reports, as shown by the Ohmer fare registers on each car, are received, together with the report of the efficiency in car operation shown by the records of the Sangamo meters, and these percentages go to the printer the same afternoon. Page proof is had on the sixth of the month; the printing is done on the seventh and eighth, the binding on the ninth and the mailing on the tenth, the date of issue.

At first our mailing list was made up from the pay-rolls of the company in the sixteen cities and towns in which we operate. From the beginning we received many requests, from people who were not in any way connected with the company, to be put on the mailing list. In this manner we have built up a list from among

the best citizenship in every city and town. That these citizens read the magazine with at least some interest from month to month is evidenced by the complaints which we receive when, for any reason, a month's issue fails to reach them.

Public libraries all over the country are also on our mailing list at their own solicitation. Early this year Harvard University was added to the list in order that the magazine might be used in the courses on public utilities in the Graduate School of Business Administration. To the management of similar companies throughout the country, the magazine is sent whenever request is made for it.

#### EXECUTIVE SHOULD BE RESPONSIBLE FOR PUBLICITY

As to the management of a publicity department we are firmly of the opinion that in every instance the company should employ a practical, trained newspaper man of wide experience rather than endeavor to use "a bright young man" already in the service, who is said to have inclinations toward journalism. And not even to a trained publicist should the policy of the publication be intrusted. The manager of the department, editor or special agent, whatever he is called, should be located near to and within easy reach of the highest executive of the company, and he should be under the direct orders and instructions of this officer at all times.

Through this officer all announcements concerning the activities of the company should be made, and all advertising agreements with newspapers should either be made by him or with his knowledge and approval. The preparation and publication of company periodicals means much more than the mere writing of the matter and supervising its printing. It means, or should mean, the maintaining of the proper relations between the company and the newspapers, to the end that the newspapers may be furnished with legitimate news and not publish unfounded rumors which might easily give rise to trouble of a most serious nature.

## Accounting and Modern Industry\*

*Accounting has played and is playing an important part in industrial development. Business without knowledge of financial transactions means failure. How accounting can serve administration*

By JOHN R. WILDMAN

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New York University, New York, N. Y.

HISTORIANS say that no nation has ever become highly civilized without having developed commercially. It is suggested by Woolf in his "History of Accountants and Accounting" that "the higher the stage of culture and development attained by a community the more elaborate are its methods of account. Accounting is the mirror of the age, and in it is reflected much of a nation's commercial history and social conditions." While there is doubtless something in this contention, I am not sure but that Woolf is over-enthusiastic even though honest in his conviction as to the important part which accounting has played in the world's history. There is, however, reason to believe that accounting has played and is playing a somewhat important part in the development of modern industry, especially in the United States.

As a country develops commercially and industrially, so apparently does accounting, in its application especially, make progress.

Germany, slow to develop industrially, has never been noted for prominence in accounting. England, on the contrary, has long been an industrial and commercial leader. It is in Great Britain that, until recently, accounting and accountancy have taken the greatest strides. The United States as a commercial and industrial country is comparatively new; consequently accounting is relatively speaking in an undeveloped stage.

Modern accounting of a constructive character may almost be said to date from the beginning of the trust movement. Brown in his "History of Accounting" speaks of some of the so-called ledgers preserved from



\*Abstract of a paper delivered before the Atlantic City Convention of the American Electric Railway Accountants' Association on Oct. 12, 1916.



the period 1300 to 1400 as being "obviously intended to serve only as aids to the memory in retaining the details of numerous transactions." So doubtless will future historians speak of some of the financial statements of the period from 1492 to 1898 in the United States. With the exception of the steam railroads, which must be given credit for the pioneer work which they did, very few concerns prior to 1898 used their financial data, granting that they recorded and compiled it, as a basis for solving the various problems of administration.

The trust movement in the United States began in 1898. During the three years which followed 149 large combinations with a total capitalization of \$3,578,650,000 were formed. Many writers and some fairly prominent authorities predicted failure. It was agreed that no one man or board of directors could successfully administer such huge organizations. The United States Steel Corporation and the United States Rubber Company could scarcely be called failures. Accounting made it possible for the executives who were placed at the heads of these giant corporations with their many constituent companies to have laid before them information as to what was being done. Accounting made it possible to run a huge business as intelligently as a small business had previously been run.

#### FORWARD MOVEMENT IN LAST FIFTEEN YEARS

The last fifteen years in the United States have seen a tremendous forward movement in accounting. The Interstate Commerce Commission as well as public service commissions throughout the country have adopted systems of accounting as a means of obtaining information as a basis for control of public utility companies. No longer is the detection of fraud and error the chief aim of an accounting system. It has been discovered that it will gather information which will not only permit comparison of companies of the same class, but also serve the purposes of the company manager and the investor, present or prospective, not to mention the taxpayer. A. W. Dimock in his book, "Wall Street and the Wilds," relates how he traveled about from Chicago in 1873, when "conductors owned the railroads and the thought of friends of theirs paying toll on their lines would have sounded the depth of inhospitality." It is doubtful if the accounting system of to-day permits hospitality to such an extent.

In other lines the progress had been equally marked. The street railway industry was among the first to recognize the need for and to work out a uniform accounting system. The National Retail Dry Goods Association has heard the call and answered with a system for its members. The Harvard School of Business Administration through its research laboratory has provided a system for the shoe industry, and is now at work on one for the drug trade. The American Telephone & Telegraph Company, with its lines and property spread over the entire United States, has a most comprehensive accounting system, without which the administration of such an organization would be impossible.

Everywhere is manifested interest in accounting. The economic cause of the interest is undoubtedly competition. Except in undeveloped or unexploited fields or industries where large profits come through force of circumstances and not good management based on facts, accurate information must be had. An instance came to my attention four or five years ago where a picture postcard concern continued in business for two years without any books. Such cases, however, are rare. One of the first steps in the organization of any concern is

to organize the accounting department. The American International Corporation, recently organized but destined probably to be a force in the world's commerce of the future, gave attention among the very first things to the organization of the accounting and auditing department.

The federal government by passing the federal income tax law served to draw the attention not only of the corporation but the individual to the necessity of keeping better financial records. Moreover, with the prosperity of the country after the present war in question, the Federal Trade Commission is urging upon business men the importance of enlarging their knowledge of accounting and improving their accounting methods. With this end in view the commission has recently issued two notable pamphlets. One is entitled "A System of Accounts for Retail Merchants"; the other, "Fundamentals of a Cost System for Manufacturers."

#### WHAT ACCOUNTING DOES TO SERVE ADMINISTRATION

As a concrete illustration of what accounting has done to serve administration, it may be interesting to note what Henry P. Schuit, a factory cost expert, wrote the author concerning some of his work in a plant out in Pennsylvania. Mr. Schuit says:

"On my present engagement I have had an interesting experience in the handling of stores and in the establishment of a control of them. This company has been manufacturing a line of goods on which they owned all patents and therefore had a monopoly. As the patents ran out, however, competition entered the field with a consequent reduction in prices. During the period that the company enjoyed the monopoly, the profits were large and no attention was paid to quantities of goods manufactured or to the wastage.

"This loose habit of management had become so fixed upon the executives that they were not handling the operating end of their business properly. It took me a long time to convince them of the necessity of the establishment of stock rooms, for they offered such excuses as that it was cheaper to have the material near the machines, that it would be an unnecessary expense to have a stockman, that it was too much trouble to keep a stock record, and many other similar ones.

"I finally got the stock-room started. There are now three, the first one having proved their necessity. After accumulating all of the product of one line of goods, we found to the surprise and consternation of all that there were more than 160,000 pieces of this one line alone, when 10,000 pieces would have been an ample working stock. This material was found in every conceivable place, around machines, under benches, in gangways, in out of the way nooks, and even in scrap piles in the blacksmith shop. The stock, of course, was the accumulation of years, manufactured in advance during their period of prosperity and then stored away and forgotten. No accounting was made of it excepting at inventory time, when it was merely lumped.

"This product was in every imaginable condition, some of it just started, and from that stage to every degree of completion up to the finished article. It took several months to gather this product and even roughly classify it. I had it classified sufficiently merely to serve the present practical purposes. It will take a year or more to sort it into the classification in which it will be ultimately required.

"As soon as we got the product together and began drawing on it, there was a difference immediately. It had been the custom, before I came here, to take an order and make it from raw material, an attempt rarely



being made to find it in stock. From 85 per cent to 90 per cent of the orders were manufactured from raw material; now the amount seldom exceeds 3 per cent. The department that has been working on raw material is now devoted to other purposes. Not a bit of raw material has been purchased since the new system was started, and it will not be necessary for a long time to come. In fact, the unfilled orders have been canceled.

"Another result that has been effected through this control is the cheapening of the cost of manufacture. As soon as the stockrooms were established and the controlling stock ledgers started, all orders were sent to the stockkeeper for him to fill and deliver to the department that was to work upon them. To the surprise of all we began to discover the great amount of spoilage, and by the very employees that were supposed to be the best men. Nothing was said to them, in the belief that the moral effect would change them. It did; these men, realizing that the automatic working out of the system would show up the results of their work, became more careful workmen. By the end of two months the percentage of spoilage became a figure hardly worth mentioning.

"Another saving that has been made is in the time of the employee. All material is now delivered to him, and he loses no time looking for his material or going to the first department which formed the raw material for him. In fact, the men have no business away from their machines or benches. Formerly the men reported time working on stock, which they frequently did when

work was slack. Now this is a thing of the past. Every bit of work goes through on order. Raw material or partly finished product brought to a greater degree of completion receives the same attention as the customer's order.

"This control of labor and materials has brought about most surprising results. The profits are hardly believable. Before I came here the management was considering the advisability of discontinuing this line of business. It has turned out the most profitable. I am writing you this letter to give you an illustration of the results that can be obtained by establishing an effective and simple control of stock, and to show that a stock record does not mean a mere record of the stock on hand, but as well one of the mediums for controlling the operations of a factory. In this case it even made better workmen of the employees."

#### KNOWLEDGE WITHOUT ACCOUNTING IMPOSSIBLE

Industry everywhere in the United States seems to be awakening to the need for accounting. The possibilities of accounting, which the big combinations were quick to see and make profitable use of, are now being realized by the rank and file of industrial organizations. The experience of the concern related by Mr. Schuit is rapidly becoming the experience of many concerns. Good accounting with intelligent use of the information presented increases profits and stimulates industry. Business is a mass of financial transactions. Business without knowledge concerning these transactions means failure. Knowledge without accounting is impossible.

## The Development of Schedule Makers \*

*Proper schedule making is the foundation of efficient operation and maintenance and of low capital charges, yet the science is of recent growth. The author urges the training of young men for this work*

By H. C. DONECKER

Assistant General Manager Public Service Railway, Newark, N. J.

IN ordinary commercial enterprises, there is a recognized ratio between the selling price and the manufacturing cost, with an attendant fluctuation in the price of commodities. Our business thus far has allowed of no such adjustment of selling price to cost of production. Our price, which is our rate of fare, is stationary regardless of production expense. Thus there remains for an electric railway operator but one course and that is to offset the high price of labor and materials by the inauguration of the most rigid economies and the avoidance of waste.

This brings us to the theme of the paper, and we will discuss briefly what an important part the development of capable schedule makers plays in bringing about efficient operation, remembering that efficient operation demands not alone that a good standard of car service be given, but also that such service be provided at a cost which will assure a fair margin of profit, if such a thing be possible.

Personal observations and experience satisfy me that up to comparatively recent years the time-table or schedule was perhaps the most neglected single unit of

cost in our classification. There is still, I believe, a tendency rather to under-rate its

importance with the result, so far as investigations show, on relatively few properties have really energetic endeavors been made to train what we might describe as traffic engineers. Let us look at the history of our own electric railway association. It was only in 1910, I think, that the question of schedules and time-tables had any place in our annual programs. Perhaps consideration of it would have been still further delayed had it not been for the suggestion of Mr. Sergeant, of the Boston Elevated Railway, that the matter be taken up. Even then it was with rather hazy ideas of just what the committee had to consider that the matter received a definite place in the activities of the association. Does all of this not indicate that we railway men may have been somewhat lax in our analysis of such a serious phase of our work?

In just what ways does this question of schedules merit the importance we are now giving to it? Let us see. We have in our classification some eighty-eight accounts. Which is the one which calls for the greatest outlay in cash? Is it not account No. 60, wages of



\*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation and Traffic Association on Oct. 9, 1916.



trainmen, which represents some one-third of our total operating cost, and all of it is billed out through our schedules and time-tables department.

What is the second item of substantial size? The power bill. Can there be any question of the influence of schedule on power consumption? Power will perhaps account for from 10 to 15 per cent of the operating costs. Next, perhaps, in importance is the question of accident cost which may run anywhere from 7 to 10 per cent of operating cost.

I think that we all agree that time-tables prepared without due regard to those elements which determine the reasonably safe speed of our cars make for results in damage claims that elicit many wild howls from the president down. We thus see that in these three items alone the schedule affects more than 50 per cent of the outlay in expenses. This is not the end, however. The ramifications of the time-table extend into practically every element of cost.

A proper schedule provides: First, a distribution of labor that provides the best possible working conditions for trainmen; second, a speed that touches the maximum consistent with safe operation and demands a reasonable minimum of power use; and third, a headway and capacity that brings about reasonable waits for passengers and a consistent maximum of comfort.

These appear to be simple elements, but think of how far-reaching they become. They embrace the maintenance accounts because a poorly constructed schedule will call for a greater number of cars than is necessary and brings with it comparable increases in attendant facilities, such as power house, carhouse and repair shops and thus automatically produces higher maintenance charges in such cars and equipment, including power stations.

Track maintenance will, perhaps, not be affected to the same extent but will undoubtedly be increased because of the greater number of cars operated or at an unduly high speed, particularly over special work. More than this, cars operated in excess of what an efficient schedule would provide requires, as stated above, added carhouse and shop capacity, thus bringing about additional maintenance and operating cost in such departments and, of course, as the property facilities grow, so does the outlay for insurance and taxes, to say nothing of the added fixed charges which the company has to assume. In the final analysis, therefore, it is safe to say that no other one department exerts such an influence for good or evil upon the welfare of our properties.

The influence of schedules does not end with the matter of direct expenses, however. Think of its power in molding that intangible but much to be reckoned-with public sentiment. Then, in addition, much as the administrators of the street railway and of the public as well are concerned in this schedule, there is one other great class which it vitally affects in both a financial and physical sense. I refer to our great army of trainmen who are not alone personally affected but whose families are in a great measure seriously concerned in the good working conditions of the wage earners. All of the above are accentuated by the tremendous problem of the rush hour. But that is another story.

#### THE WORK REQUIRED OF THE SCHEDULE MAKER

So much for the rôle of the time-table in making for the success or otherwise of a street railway company. Now for the work required of the schedule makers. The schedule is no longer the simple setting down of columns of figures indicating a certain number of trips to be made by given crews and providing a capacity which is estimated to be equivalent to a demand based upon a more or less cursory observation of traffic and not the result of any special study of the real requirements of

the line. What are the exactions placed upon the schedule maker of the present day? He must first make close observation of the residential and business characteristics of the district through which the line runs. He obtains data showing the passenger demand throughout the full period of operation each day, securing at the same time a record of the riding habits of the people which brings out the origin of the business and its destination points. An analysis of the possibilities of the line in the way of speed must be determined, this work involving an accurate account of the number and time of stops, the physical characteristics of the route as to grades, etc., the records of congestion, consideration of the cars and equipment available, possibilities in the way of coasting and by no means last in importance, the requirements of safety first. Having such material in hand, most of it probably obtained by subordinates but carefully checked by the personal observations of the man in authority, all must be properly co-ordinated and at last the preparation of the basic time-table, itself, is under way. This completed, patches are made for use as the exigencies of weather or other conditions require diminished or increased service. Then commences perhaps the most difficult task of all which is the nice allotment of the capacity provided to take care of the patrons into periods of work for the men which will be as satisfying as possible from the two standpoints of wages and comfort.

After the table is in effect we have its periodical checking to determine its success in actual operation, this requiring the development of traffic counts, observations of running time, etc. Running time becomes a variable factor largely contingent upon the amount of congestion in the streets at different periods of the day and necessitating different sets of running times as the difficulties of operation increase or recede. Our schedule department is also charged with other duties including the preparation of charts and tabulations of conditions to meet complaints, the preparation of data for use in cases before utility commissions, the development of subordinates along the line of ability to appear as witnesses before commissions or other regulatory bodies and as our cities grow and districts change in character come studies of the movement of passengers particularly transfer movements to form the basis for the possible re-routing of cars.

#### WHERE CAN SCHEDULE-MAKERS BE OBTAINED?

• It will be seen from the above how varied are the duties of a really efficient schedule making force, and we are thus faced with the problem of the character of the men to assign to such work. Under present conditions it is probably true that most of the recognized expert time-table men are recruited from the ranks of the platform or street supervisory forces, men who by their personal knowledge of conditions of traffic, their ability in knowing how to meet sudden changes in demands, their knowledge of the psychology of the traveling public and the energy which has made it possible for them to advance in life, provide us with schedule makers who have "just grown up." We might likewise apply this same phrase to some of the schedules that are operated. Is this field still available? Or because of certain enlarged technical knowledge demand must we penetrate into other fields to obtain the men who will best prepare the diversified data now required from our transportation department? Lately, there have entered many young engineers who, taking what is styled a cadet course, passing through the various departments of electric railways have finally been established in the transportation department specifically assigned to the department of schedules and time-tables, placed under



men who for years have observed the grinding demands of passenger transportation. These men are taught the mechanics of schedule making in so far as such instruction may be obtained within the confines of an office. Combined with this training has been their assignment to work directly on the streets and on the cars. All of the phases which we have indicated hereinbefore as necessary in present day schedule-makers are brought to the attention of these young men whose work is checked or rather corroborated by other men working independently along parallel lines. The instruction given by their superior officers, the conferences carried on almost continuously to discuss ways of meeting new conditions constantly arising, the time spent directly on the ground along the various lines of the company, the energy that they are required to expend because of having to meet assignments at all hours of the day, the experience derived from attendance at public utility commission hearings at which the public sets forth its criticisms together with the enthusiasm that the study of transportation problems inevitably develops if a man is temperamentally suited to such work, the application of his engineering knowledge in the preparation of charts and the development of formulas of travel, and the knowledge of the different departments of the property acquired through the cadet course—all these factors have produced for one company a set of young men whose worth has definitely fixed the status of the traffic engineer.

Hampered though such an engineer is with the absence of long years of experience in actual transportation work, there is no question that the success of the plan I have herein somewhat generally described would not have been accomplished or at least would have required a very extended period of time without the assistance of the wise old heads whose direct experience with the problems right out on the ground enable them not alone to produce efficient time-tables themselves, but to impart their knowledge to the young men and this they have done unselfishly and well. The answer would appear to be that a company, and perhaps this is more applicable to companies of the larger size and especially those with high rush-hour peak demands in order to secure maximum efficiency, would do well to consider the acceptance into their service of technically trained young men loyal and energetic who are temperamentally suited to fit into the transportation field. The qualifications for such work include first, good judgment and ability to be a mixer, and to work without friction under or with all other men in our car service departments, ability to observe just how the old man on the street handles his job, sufficient initiative successfully to meet critical conditions quickly and with judgment, horse sense and an unbounded energy and ambition which makes it a pleasure to get away from the idea that a man should work only regular hours say from nine to five, and have his Saturday half holidays and his Sunday to himself.

## National Issues in Local Franchises\*

*Pessimistic views of regulation, protection of investment and rate of return are ill-founded. Future franchise protecting investment will be well received. Utilities quasi-public as to privileges, performances and risks*

By PROF. CLYDE L. KING

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FRANCHISE policies must necessarily be based on judgments as to future conditions. This is just as true of the restricted franchise as the unrestricted, the term franchise as the indeterminate. In some fields there are sound facts or known traditions on which judgments can be based; in other fields judgments must necessarily be little more than guesses. Hence the element of speculation in past franchises, as the financial histories of utilities show. Anyone securing or accepting a franchise of any kind where a permanent investment is to be made must necessarily ask certain questions as to future conditions. Among these questions at this time these three are paramount: what has the next twenty-five years in store as to (1) regulation, (2) protection of investments and (3) rate of return? As will be the answer to these questions so must be the policy toward franchises.

The answers to all of these questions are determined largely by national and, indeed, to an extent, by international conditions. For not only are there national issues in every local street railway franchise but there are international issues as well. The one big factor in future utility policies is the coming internationalism. Just as plant or animal species have survived because protected by natural barriers, and are destroyed when new means of transit overcome those barriers, so not only local but national economic

peculiarities due to isolation will vanish with increasing rapidity before the present and future worldwide economic internationalism.

It is easy to take a pessimistic view of the future in the street railway world as to regulation, protection of investment and rate of return. It can be held that regulation will be by the politicians for the politicians, or by the corporations for the corporations, or by the rate-payer for the rate-payer—in any such case to be discredited and finally abandoned, not for non-regulation, for no one would now expect that, but for public ownership as the only way for all the parties having real interests to safeguard those interests. The pessimist can prophesy at least a partial destruction of street railway values by competition of the flying machine, the trackless trolley, the motor bus; or by the automobile alone, giving especially to the lower price of automobiles, the increased purchasing power of the public and the rapid increase in good roads. Or the pessimist can hold that the suburbanizing of cities and the growth of manufacturing in the small towns will tend to make the average street railway haul in excess of a profitable haul for 5 cents, and that the 5-cent fare is such a deep-seated American tradition that intense public antagonism will be aroused against street railways which



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seek to increase the fares, abolish transfers, adopt the zone system or shorten the haul. And as to the rate of return, the pessimist may urge that, after the European war is over, America will be a creditor country, with plenty of money to invest at low rates of interest in domestic affairs, a more promising return on money to be secured only through investments in foreign countries, and that this situation will tend to force by public opinion a relatively low rate of return on public utilities. If such conditions are to prevail in one or more of these fields, then to be sure street railway franchises must be framed accordingly and perhaps with a view to public ownership.

#### VITAL FACTS, HOWEVER, ARE OVERLOOKED

But these pessimistic views leave out of consideration some very vital facts. Certainly with the growing increase in efficiency in government and in the rapidly rising standards of governmental conduct, both the public and the corporations can be relied upon to see that regulation is not in the interest of the politician. With the dissemination of information as to unit costs in utilities, it certainly can be expected that selfish regulation, whether for the corporation or for the ratepayer, cannot persist. Only if facts shape the regulative judgment will regulation continue. In the announced policy of the American Electric Railway Association to give out all the facts lie the hope and the promise of sane regulation. For in this matter the taxpayer and the utility must make common cause. Rights are derivative, not innate. They are derived from government and expand to higher planes only as government is efficient, and are protected only in so far as government is competent—a fact that business men sometimes forget.

Government cannot be partisan where one wants it to be partisan and non-partisan when administrative competency is desired. Government cannot be "political" in local matters and non-political in State or national regulation. The taxpayers, the business man, the utility manager must unite to place and keep government on a plane of non-partisan competence in administrative and executive matters. For unless regulative bodies have the independence and the poise of administrative courts, all who put their trust in regulation must suffer none so much as the companies, for in politics in this issue the larger number of voters are on "the other side." And, it must be repeated, competence in regulation is secured only through competence in every phase of government. He who pulls down city or local government imperils state and national regulation. He who pushes forward competency in government in any one field pushes it forward in another. It's the salients that count. One can safely assume, therefore, in drafting franchise policies, that the present-day plan of regulation, while still on trial to be sure, will persist in a way acceptable to the parties at interest only because all men in business will increasingly unite with one another to make all government competent.

A study of motor costs will indicate that the motor buses cannot haul passengers at a profit for the distance that street cars can haul them. This fact alone will prevent any devastating competition from motor buses. Certainly the very immobility of capital itself will prevent any devastating competition from motor petitor in the next two decades, even assuming that the experiences of the present war put the flying machine on a commercial basis. Inasmuch as the expenditure of more than three-fourths of American families for recreation and amusement cannot be in excess of \$100 per year, the competition from the privately

owned automobile can be disregarded. At least it will be counteracted by the natural growth of the riding habit.

These pessimistic views not only leave out of consideration certain very vital facts, but they also leave out of consideration what is still more important, certain deep-seated American traditions and attitudes. One of these traditions is a wholesome respect for property and property rights. In no country on earth is there such a wholesome respect for property as in the United States. This tradition finds its basis in that American belief that all who now are not may become property owners. It is a safe prediction that the increasing wages of American earners will tend for some time to keep up this tradition and to prevent the organization of large numbers of voters entirely antagonistic to capital, such as is the rule in continental countries. More abiding because more fundamental than any law or set of laws or any court decision or set of court decisions, this American tradition will compel a continuing respect for properties that represent actual money investments. Such wholesome traditions, molded as they will be by the increasing stability of protected utility investments, can be counted on as continuing, and these traditions, it can be confidently expected, public service commissions and other public service and regulative bodies will reflect.

The rate of interest will be determined very largely not only by national but by international conditions. It will, no doubt, be true that the impatience of Europe to restore normal industrial conditions will tend to raise the rate of interest after the European war. It is probable, also, that the rate of interest in foreign investments will tend to be much higher than the rate of interest in domestic investments, and this for the very simple reason that the American nation will probably be increasingly a creditor nation with the same laws as to a relatively lower rate of interest on investments in the home country than in foreign countries, as has been true in the European creditor nations in the past generation. But that the domestic rate of interest will become unenticing to investors (as distinct from speculators) in American public utilities does not seem at all probable. It is a conservative statement that efficiency in management alike in all public and private industry is in its infancy. The pick-up through efficiency in organization is to be the great industrial gift of the next quarter of a century. This competency in management the war-ridden countries and those blessed with peace will, no doubt, reward amply.

#### PROTECTION OF INVESTMENT IMPLIES HIGH STANDARDS FOR ALL

On the other hand, just because we shall have passed the unsettled conditions of a debtor country, and just because we shall have come into the more stable views of a creditor country, the American people, if they have a modicum of the Yankee shrewdness with which they are credited, will insist that their recognition and protection of property rights, which they yield so generously, be on the basis of actual investment as far as their serving utilities are concerned. Respect for utility property by the public implies a mutual respect on the part of utility owners for the public and the ratepayer. Instead of accrediting the successful "anti-Wall Street" or "anti-corporation" campaign solely to the cussedness of the propertyless, it might be now and then worth while and infinitely more wholesome to think of these campaigns as due in a measure to the determination of one Yankee not to fall too easily for the tricks of another. If the corporation is asked to file a report open to public inspection and then it is found that these



reports have been cunningly "doctored," what will the average American decide other than that such doctoring impugns the integrity of the investment? And will he not tend to conclude that the more astute the cunning, the less his obligation to protect the investment? What will the average American—if he has any of the tendency to look to his pocketbook with which foreign critics credit him—what will any average American decide if he should find that what he has been respecting as property represents but little actual investment or but the re-investments of moneys received from rate-payers? Protection of investments implies high standards on the part of all. Integrity inspires confidence; sharp practices undermine it.

"I am a believer," wrote Thomas A. Edison to William D. Marks in a utility matter about fifteen years ago, "in insuring the permanency of an investment by keeping prices so low that there is no inducement to others to come in and ruin it. There seems to be a law in commercial things as in nature. If one attempts to obtain more profit than the general average, he is immediately punished by competition." This law will remain in operation, even though the company has a complete monopoly. To force the rate of agreed return to a point beyond what the public will regard as fair is to invite contrasts between the interest on public bonds and the return to privately owned utilities. Comparison with other countries or with other industries—is a deed, the very existence of technical knowledge—is a competitor. And this knowledge is to become not only international but easily mobilized. Technical knowledge is to be the fair yet positive arbitrator of the future. Successful experiments in other countries, whether of public or of private ownership, whether in management or in economics in generation or distribution of current, will flow as swiftly from continent to continent as formerly from county to county. Future policies must be shaped in the light of mobile and accurate technical information which will be as accessible to the public as to the corporation.

The American spirit toward capital is wholesome, genuine and generous. But a stable social and industrial life simply will not sanction the large returns and the capital inflations that the risks of a frontier life gladly sanctioned. The American's views toward property, while generous, are slowly but surely shaped by his environment and business interests. These views, therefore, even more in the future than in the past, for the middle class income of the future will be more stable and more thriftily guarded, will probably hold that those in the public service shall write down squarely what their money investments are and ask for a rate of return comparable to the risk in the enterprises, and in related private businesses as modified by the protection to the capital invested in the public utilities guaranteed by the laws and by public service commissions. This, so far as I can read the attitude of the next generation, will be the only limitations, if limitations they be, upon the American tradition of absolute and complete respect for property. It cannot be expected that the rate-payer of a stable creditor country will give through the state a guarantee to utility investments such as he gives to no private industrial investment and then also give to the utility investor all of the increments or advantages that necessarily flow to competitive businesses where such protection is unknown.

#### PUBLIC OWNERSHIP WITHOUT ITS RISKS

The question has not been asked as to the future in public ownership. If the public can fix a rate value at less or even the same as a condemnation value, if the

public can regulate the rate of profit, the amount of capitalization, the ratio of stocks to bonds, the exact time and charge for the haul, the character of service, the politeness of the platform men—is this not public ownership in essence? Public ownership in the sense of public control is not a force to be feared; it is a force already here. It is not public ownership, to be sure, in the sense that properties may be confiscated, or in the sense that service can be compelled at a loss, though in legal theory this can be done. Nor, and this is more to the point here, is it public ownership in the sense that the public must necessarily assume all the risks of ownership.

What this country has under regulation is in fact at least quasi-public ownership that makes all street railway operators in a sense public officials. If the public wants to be selfish about it, regulation has in it possibilities for the public not possible in public ownership. That is, the public may have its cake and eat it, too; the advantages of ownership without its risks. The public and the operator will both be the better off the sooner the public character of street railway service and operation is completely recognized. The real question is not as to the future of public ownership. The real question is whether under regulation there will be public ownership without the responsibility of ownership or, on the other hand, a regulation that does not regulate. Under conservative franchise policies one can rely on American traditions, business sentiment and sense of fair play to see that neither extreme is followed.

#### SOME M. O. PROPAGANDA ERRONEOUS AND FUTILE

In view of this situation, however, it may well be questioned whether the payment of money to magazines for fallacious propagandic work against public ownership, such as certain utilities, more especially utilities other than street railways, have been and are doing, as far as I know, is that type of stupidity for which one should apologize as my cook did when she poured milk into a sieve, and she had the good conscience to know that her stupidity was all the more culpable because some one else paid for the milk. In the first place, utilities are in law quasi-public. Just to the extent that they are in law or in fact quasi-public, their operators and managers are quasi-public officials. And the extent to which these properties are quasi-public and the extent to which services can be compelled measure the extent to which the properties are already in fact though not in fee public properties. Government is a partner in all twentieth century business, and in quasi-public businesses particularly it is far from being a silent partner. And does it come with good grace for one in one kind of public service to complain of some other kind of public service, by "news" that is erroneous? The erroneous statement in the magazine supported in whole or in part by assessments on utility companies reflects on the sworn statement. This may be an unhappy fact, but it is nevertheless the sort of social fact that those in public businesses must recognize.

Moreover, is it at all unlikely that America may become as England, France and Germany had become, a creditor nation, with opportunities for lucrative investments abroad? And is not possible, as has been the rule with creditor nations in the past, that the rate of return in foreign investments will be more enticing than the rate of return on domestic investments? The wide extent of public ownership in Great Britain, France and Germany is to be accredited in part, and to a larger part than is usually conceded, to the fact that investors found larger returns in other fields and pre-



ferred to sell their utilities to the public in order to release their money for more profitable investments elsewhere. That is, public ownership did not come with the opposition of the owners of utilities but with their sanction, the real question being as to what the sale value should be. Can anyone say that these nations are not the stronger because public credit was used (where it could be used) for quasi-public ventures, and private credit (where private credit only could be used) for commercial and industrial development? Can anyone say with finality that American investors may not find more profitable fields for their money than stable and regulated domestic utilities with their competition from a low interest rate on public bonds? Is it, therefore, unthinkable that the investors themselves may within the next generation find it to their interest to sell to the public? And should they want to sell, may not this very propagandic literature rise to plague them? Or at least rise to insist that, since public operation is less competent than private operation, the selling price to the public must be, therefore, considerably lower?

Or let us assume that this kind of propaganda is in good taste and is good business. For, of course, it is sound business to combat public ownership that destroys properties by competition with the money furnished by the taxpayer. But is it effective and worth while for the utility company to do this? Can opposition to public ownership be measured by the number of clippings needful editors take from a gratuitous news service? May not that very kind of activity lead the public to ask questions as to the private profits of concerns that needs must spend so much money to oppose by erroneous statements another kind of ownership and operation? And may it not give to the friends of public ownership popular support on the stump-worn doctrine that such activities are a sort of poisoning of the wells of public information?

From any point of view it seems to me that this sort of propaganda is not to be expected of the type of clear-visioned able utility operator which the next generation will need and is going to have and which this generation already has in such growing abundance, in no utility so much as in the street railways. These queries are not put out as an argument for public ownership but as queries as to the conservative attitude toward public ownership under conditions where public ownership in possible results exists anyhow. Of course, the citizen in any business will proclaim facts where public interests are involved—proclaim them from the house tops if need be. But why impugn righteous activities with an erroneous, needless and futile propaganda?

#### FRANCHISES TO PROTECT ACTUAL INVESTMENT

If these views as to what the next twenty-five years have in store as to regulation, utility investments and rate of return are sound, what do they indicate as to franchise policies? Is it not this in substance—that franchise privileges should be so drawn or interpreted as to safeguard actual money investment with a sufficient rate of return to keep and attract capital? With franchise policies along these lines, public utility managers and operators will unquestionably find adequate support alike from investors and public. With franchise policies along the lines of justifying speculative elements past or future, however, utility managers and operators can expect from both the investor and the public an attitude of increasing criticism and suspicion.

#### THE INDETERMINATE FRANCHISE OF THE FUTURE

In the main there are two kinds of franchises, the term and the indeterminate. What do these influences

and traditions mean when applied to each? With the indeterminate franchise, where public ownership is possible only through purchase of the existing utility, they mean particularly stability in valuations. If the foregoing represents at all the views of the next generation, the advice of those engineers who have helped to boost valuations through imaginary reproduction will be looked upon in its after effects as short-sighted.

A Chinese student has recounted to me the cordial public approbation bestowed on the noted Chinese statesman when he framed and secured the passage of the American-Chinese exclusion treaty, and the contempt and indignation at the treaty and its author at the present time. Why? There was an honorable and ancient Chinese tradition that he who gave up his country for another was guilty of the gravest act against his government, an act that was not merely unpatriotic but treasonable. But that tradition, even before this treaty was signed, was crumbling away before the advancing opportunities afforded by western industrialism. Within an incredibly short time, China awoke to the fact that this treaty, howsoever sanctioned by tradition and precedent, was subversive of her industrial future and opportunities. The Chinese statesman who framed the act was, no doubt, acting on what he regarded as immemorial precedent. He did not realize that what was most acceptable in the present might be most harmful within even a decade. Or possibly he knew the tendencies but did not believe that China would yield so soon or so readily to the push of western progressivism.

The valuation theories and methods that go out to make valuations far in excess of cost can but breed suspicion, not confidence. Already their day has passed. It may be questioned whether even now the engineers advocating them are called on for other important engineering duties. Not long ago I read this advice to a western utility of an engineering firm that looks to the morrow as well as the day: "Be conservative. Have not an item, a unit cost or value that can be successfully combatted. Don't build up more than you expect in the hope of having something to bargain with. Put values where values actually are and stand by them." Thus runs the tenor of the advice and, viewing the future as I do, I regard it as most wholesome. It must be said, however, that not all the blame of excessive claims for valuation should be placed upon the engineer. Part of this policy is due to the more or less flamboyant methods of the lawyer, methods that may work before a jury but soon end before specialized tribunals.

For what can be expected in the long run of the confidence of the investing as distinct from the speculating world if the fair values fixed by public service commissions continue to run far below the values claimed by the companies or far below the capitalization placed on the properties by the companies? And how can the suspicions of the public that have been admittedly justified by past instances be allayed when rate cases become merely struggles for the recognition of inflated values by the reproduction route? Moreover, and this is the crux of the whole matter, can anyone look into the future and assert with confidence that over a twenty-five or thirty-year period reproduction values will continue to be in excess of original cost values? In the long run, all precedents to the contrary notwithstanding, will not cash investments prove the standard to which values most nearly approach? At least is this not sufficiently probable that utility policies can most safely be based upon it? If such is the case, then, under indeterminate franchises, future franchise policies will be based on stable values, shorn of their speculative



elements and hewed closed to actual costs. With such a situation, one could certainly expect an enthusiastic reception by investors and also a wholesome co-operative spirit on the part of rate-payers and the general American public.

#### THE COMING TERM FRANCHISE

As to term franchises it would seem that the contract stating and protecting the sum invested and limiting the power of the public to purchase at an agreed price, would be preferred by the investor. The vital protection to the utility owner in both the term and the indeterminate franchise is the alternative of public ownership to public competition. If the public is to give up the safeguard that lies in the actual or potential competition through public ownership, it can reasonably expect in return the stabilizing of values in its contract agreement. I can see that the lawyer for the public may urge that it is not to public interest to enter into such a contract on the ground that rate value will be less than condemnation value. I can understand many situations where the company would not want to enter into such a contract. On the whole, however, I believe that investors particularly will increasingly recommend this type of contract.

This procedure for absolute guarantee of the actual investments in both term and indeterminate franchises leaves the public to bear the risk. This the public can well afford to do, for if it does not squarely assume these risks and if utility investments are not guaranteed, then the risk must be expressed in higher capitalization and in a higher rate of return, to be paid for in both ways by the rate-payer. His share in the risk of these industries the average American city resident will be glad to take in order to insure stability and development in his public utilities and particularly his transit facilities.

#### MUTUAL DUTIES OF UTILITIES AND PUBLIC

These policies in franchises require a corresponding attitude on the part of the public on the one side and the managers and operators of street railways on the other. These utilities are quasi-public, say the courts. This must not mean that they are quasi-public as to privileges and private as to performances, or quasi-public as to public services and private as to risks. It must mean that these utilities are quasi-public alike as to privileges, performances and risks. It does mean,

or if not it must come to mean, that the manager or operator of these utilities is in spirit and in truth a public official who goes to his work with the spirit and with the zest of a competent public official under all the advantages belonging to a public business privately owned.

Of the duties of the public utility we have heard much; we have also heard much of the duties of the public and the rate-payer. But we have not learned that these duties are mutual, and we are not awake to the fact that fundamentally they may not be antagonistic. It is the duty of the citizen to know facts as to his utilities; it is the duty of the utility to furnish those facts rock-ribbed and unassailable. It is the public duty to protect money investment; it is the corporate duty to ask that money investment only be protected. It is the utility's duty to serve all who come at just prices without discrimination; it is the rate-payer's duty to learn from the sources enough facts as to rates, operating difficulties and labor costs to have a fair judgment as to what a "just" rate and "adequate" service are. It is the new corporate duty to give publicity to facts and facts alone; it is the new public duty to base judgments on facts and facts alone. Herein lies the hope of urban development and the stability of utility investments. When the public sees the utility as a public asset and the operator and financier does his work on the high plane of a public privilege well performed, the seeming obstacles to security investments will vanish and these vital public services will be put on a plane of permanency and highest efficiency. This may sound idealistic, but policies must be shaped in the shadow of ideals. Otherwise they are not policies; they are schemes.

I have but expressed what I know to be the spirit of a large and rapidly growing number of street railway investors, managers and operators. I have had in mind throughout the investor, not the speculator, for the law of speculation will remain unwritten. I believe that conservative franchise policies that protect investments with the alternative to public ownership and operation will tend to preserve the best in regulation, will give such a stable and adequate return to street railway investments as to make them enticing, and will place the business of owning and operating street railways on a plane of dignity and stability that will invite a mutually cordial attitude between the public and the operator.

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**"I**T is the public duty to protect money investment; it is the corporate duty to ask that money investment only be protected. It is the new corporate duty to give publicity to facts and facts alone; it is the new public duty to base judgments on facts and facts alone. Herein lies the hope of urban development and the stability of utility investments. When the public sees the utility as a public asset and the operator and financier does his work on the high plane of a public privilege well performed, the seeming obstacles to security investments will vanish and these vital public services will be put on a plane of permanency and highest efficiency."—*Prof. Clyde L. King.*

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# Proceedings of the American Association



PRESIDENT CHARLES L. HENRY

The Atlantic City Meeting Was Characterized by Several Speakers as the Best in the History of the Association. Representatives of the United States Army Spoke on Preparedness, the Technical and Financial Development of the Electric Railway was Considered, and Publicity Was Not Neglected.

**T**HE thirty-fifth annual convention of the American Electric Railway Association, held in Atlantic City, N. J., from Oct. 9 to 13, 1916, was called to order by President Chas. L. Henry at 9.30 a. m., on Tuesday, Oct. 10. Mr. Henry first read his presidential address, an abstract of which forms the leading article in this issue. This was followed by the reports of the executive committee and the secretary-treasurer, which were read by E. B. Burritt. The report of the executive committee, which consisted of the minutes of the meetings held during the year, was read by title.

## REPORT OF THE SECRETARY-TREASURER

Following the amendment to the Constitution and By-laws at the Chicago meeting which permitted the entry into full membership of manufacturing companies, President Henry extended a cordial invitation to the manufacturers to enroll their companies. The response to this invitation was most gratifying and a large number of companies promptly forwarded their applications for membership. Subsequently, the committee on company membership was increased by the addition of seven manufacturers, one of whom was designated a co-chairman and this branch of the committee took charge of the membership work in connection with the manufacturing companies.

The manufacturers generally have appreciated the opportunity to co-operate in the service which the association is performing for the industry. Already they have given practical evidence of the value of that co-operation in connection with the successful efforts of the association in bringing about the exclusion of the electric lines from the operation of the eight-hour law recently enacted. Their response to the association's call was prompt and effective.

To date we have 208 manufacturing companies enrolled in and working with the association.

With the taking into membership of the manufacturing companies, there devolved upon the association the management of the exhibit and matters in connection therewith. To assure the faithful performance of this duty, the president appointed a general convention committee with a manufacturer as its chairman. Subcommittees of this general committee, each with a manufacturer as chairman, were placed in charge of the exhibit, entertainment and the exhibit finances and worked out the details of these matters. To handle the details of the exhibit, Fred C. J. Dell was employed and has been engaged on this work since May 1.

The convention opens with an exhibit occupying 55,-

## PROGRAM

### TUESDAY

Annual Address of the President.  
Annual Report of Executive Committee.  
Annual Report of the Secretary-Treasurer.  
Report of committees:  
Convention—Thomas Finigan, chairman.  
Education—H. H. Norris, chairman.  
ADDRESSES—Coast Defences—Capt. Walter King Wilson, U. S. A.  
Employment of Trolley and Electric Transportation in Military Service—Col. Chauncey B. Baker, U. S. A.  
Report of committees:  
Federal Relations—Arthur W. Brady, chairman.

### WEDNESDAY

Reports of committees:  
Representing Association at American Good Roads Congress—Gordon Campbell, chairman.  
National Joint Committee on Overhead and Underground Line Construction—W. J. Harvie, chairman.  
Cost of Passenger Transportation Service—J. D. Mortimer, chairman.  
Company Membership—George W. Knox, chairman.  
Electrolysis—Calvert Townley, chairman.  
Award of Company Section Medal—H. R. Fehr, chairman.  
Conditions of Anthony N. Brady Medal Contest—Arthur W. Brady, chairman.  
Valuation—J. N. Shannahan, chairman.  
PAPER—"Overhead Charges in Valuation," P. J. Kealy.  
Report of committees:  
Compensation for Carrying United States Mail—Henry S. Lyons, chairman.  
Company Sections and Individual Membership—Martin Schreiber, chairman.  
Public Relations—C. Loomis Allen, chairman, subcommittee's reports.  
ADDRESS—"Publicity," Ivy L. Lee.  
Report of committees:  
Aera Advisory Board—H. C. Donecker, chairman.  
Changes in Constitution and By-laws—General George H. Harries, chairman.  
Operation of Motor Vehicles—Britton I. Budd, chairman.  
Insurance—A. H. Ford, chairman.  
Standards for Car Loading—S. W. Huff, chairman.  
Street Traffic—J. K. Punderford, chairman.

### THURSDAY

Report of committees:  
To Confer with the United States Bureau of Standards as to Safety Code—W. J. Harvie, chairman.  
Taxation Matters—Henry S. Lyons, chairman.  
ADDRESS—"The Physical Development of Electric Railways," Frank J. Sprague.  
ADDRESS—"The Financial Development of Electric Railways," A. B. Leach.  
Reports of convention committees:  
Unfinished business.  
Election and installation of officers.

694 sq. ft. of space. In size this compares favorably with exhibits of past years, and in the quality of the appliances and equipment displayed and their interest to the railway man, former exhibits are surpassed.

## MEMBERSHIP, COMPANY AND INDIVIDUAL

The work of soliciting the membership of non-member railway companies has been vigorously followed up during the year—principally by means of circular letters. In addition, many special letters have been written from the secretary's office. The result has been the enrollment of nineteen companies—of these the membership of four will date from Nov. 1, the beginning of the association's next fiscal year. Business conditions have been unfavorable with a large number of those companies remaining outside of the association and as conditions improve with them, it is believed that a considerable number will enroll.

The association at the last convention reduced the annual dues of members of company sections from \$5 to \$2. The change was favorably received and has brought good results.

The committee on company sections and individual



membership has been actively at work throughout the year and has been instrumental in organizing four new company sections among the employees of the following companies: these being at New Haven, Conn., Washington, D. C., Portland, Me., and Hampton, Va.

The total enrollment of company section members is now 1473. A number of companies have indicated their interest in this movement and are now considering the organization of sections on their properties.

The committee has also been active in the work of securing additional individual members. Selected lists were prepared and to these lists were addressed a number of letters. Literature in the form of a pamphlet and folder were circulated extensively. The individual membership now stands at 1513. This shows a decrease from last year for two reasons.

Many individuals formerly members are connected with manufacturing companies which have not yet joined the association and as individuals connected with non-member companies are ineligible for membership, it was necessary to drop these from the rolls. In the case of individuals connected with member manufacturing companies a number of these have not renewed their membership because this was only incidental to securing a convention badge, and this year the badges will be issued to railway and manufacturers' delegates alike and without further requirement than that their companies shall have enrolled. In other words, the \$5 payment which carried with it an individual membership, formerly exacted of all manufacturers at conventions, is not required under the present arrangement.

#### OTHER ACTIVITIES

The bureau of information at association headquarters is steadily widening its scope and increasing in its value to the membership. An important work accomplished during the year was the compilation and issue to member companies of a comprehensive bulletin on wages of motormen and conductors. The information in this bulletin was secured from 756 companies, a large number of non-member companies contributing data. The information is being kept up-to-date, and another edition of the bulletin will be issued early in the coming year. In accordance with instructions from the executive committee, there was also collected information relating to company publications.

We have received during the year 447 requests for information from 168 member companies and from thirty outside sources. In many cases it was necessary to undertake special investigations to secure the data. In all cases the requests were promptly met. In connection with the bureau is maintained a file of commission decisions which is kept up to date. This information has proved of considerable value and is frequently called for by member companies. The bureau is also continuing a part of the work formerly carried on by the Bureau of Fare Research in collecting operating statistics of member companies.

During the year the revisions of the Engineering Manual were published and issued free to member companies and at cost to those individual members requesting them.

The committees appointed during the year by the five associations and numbering sixty-four, have been at work on a great number of important subjects. The results of their labors are embodied in their reports to be presented to this convention and the industry will find them to be of the greatest interest and value.

At its meeting of Feb. 3, the executive committee authorized the president to appoint a committee to cooperate with the War Department, the purpose of this committee being to collect such data regarding the electric lines of the country as would be of service to the

#### STATEMENT OF MEMBERSHIP

	Railway	Company	Individual
	Mfg.	Total	
Number of members Nov. 1, 1915..	349	349	2,682
Number of members reinstated....	4	4	33
Number of new members.....	19	208	41
Total .....	372	580	2,756
Resignations .....	11	11	629
Changes to company sections .....	...	...	614
Grand total .....	361	208	569

#### FINANCIAL STATEMENT

For Ten Months Ending Aug. 31, 1916

Cash balance, Nov. 1, 1915.....	\$11,055
Revenue to Aug. 31, 1916.....	97,598
	\$108,653
Expenses to August 31, 1916.....	\$72,902
Other disbursements for items now shown	
as inventories:	
Badges purchased .....	\$443
Less badges sold.....	57 \$386
Furniture and equipment.....	633
Paper .....	138
Petty cash .....	500
	1,658
	74,561
Cash in bank September 1, 1916.....	\$34,092

#### INCOME STATEMENT

Ten Months Ending Aug. 31, 1916

Revenues		
Admission fees:		
Railway companies .....	\$110	
Manufacturing companies .....	1,820	\$1,930
Annual dues:*		
Railway companies .....	\$49,493	
Manufacturing companies .....	5,835	
Individual dues (\$5.00).....	6,121	
Company section members (\$2.00).....	2,274	63,725
Miscellaneous income:		
Rent of convention exhibit space.....	\$13,497	
Convention donation .....	375	
Interest on deposits .....	488	
Sale of advance papers, annual reports and year book .....	475	
Sale of "Engineering Manual".....	251	
Sale of "Cost of Transportation Service".....	522	
Sale of "Bibliography on Valuation".....	130	
Sale of other pamphlets.....	307	
Public relations fund.....	3,200	19,247
Aera:		
Advertising .....	\$12,525	
Subscriptions .....	152	
Sale of extra copies .....	10	
Sale of binder .....	6	
Other pamphlets .....	...	12,695
		\$97,598

\*Includes \$9,109 received as Aera subscriptions.

#### EXPENSES

Ten Months Ending Aug. 31, 1916

American Association:		
Salaries of general office staff.....	\$13,258	
Salary and expenses of Washington representative .....	416	
Rent of office and store room.....	3,381	
Stationery and printing .....	2,222	
Postage .....	2,363	
Repairs to furniture and equipment.....	46	
Office supplies and expenses.....	893	
Telephone, telegraph and messenger service.....	503	
Express, freight and cartage .....	192	
Exchange .....	90	
Traveling expenses of secretary.....	14	
Miscellaneous general expenses.....	1,010	
Advance papers, annual report and year book...	1,745	
Committee expenses .....	4,545	
Mid-year meeting .....	1,203	
Annual dinner .....	506	
Bureau of fare research.....	870	
Engineering manual .....	814	
Publication of "Cost of Urban Transportation Service" .....	1,132	
Bibliography on valuation .....	675	
Printing miscellaneous pamphlets.....	18	
Accountants course .....	1,256	
Annual convention .....	1,873	
Exhibit expenses .....	1,668	\$40,706
Accountants Association:		
Advance papers and annual report.....	\$526	
Committee expense .....	365	
Miscellaneous expenses of secretary.....	1	893
Engineering Association:		
Advance papers and annual report.....	\$3,462	
Committee expenses .....	3,267	6,729
Claims Association:		
Claims advance papers and annual report.....	\$556	
Committee expenses .....	362	
Miscellaneous expenses of secretary.....	124	
Hooper-Holmes Index Bureau.....	563	1,606
Transportation and Traffic Association:		
Advance papers and annual report.....	\$902	
Committee expenses .....	1,426	2,329
Aera .....		20,637
Total .....		\$72,902



War Department in time of emergency. This committee will shortly undertake its work.

The association has continued as its Washington representative, the firm of Clark, Prentiss & Clark, who have kept in touch with the progress of matters affecting electric railways before Congress and the Interstate Commerce Commission.

The association's subscription to the Hooper-Holmes Bureau was continued for 1916. Fifty-six companies made 18,062 reports, the bureau returning reports on 1578 names.

Acting under instructions of the executive committee, your secretary has co-operated with the Utilities Publication Committee in the endeavor to secure a wider circulation of the Public Utilities Reports Annotated. The membership was advised by letter of a special subscription offer made by the company and mention was made of this in *Aera*. The magazine also called attention at various times to the value of the reports.

On May 1 the association headquarters was enlarged by the addition of two office rooms. This provided much needed space for the offices, which were overcrowded.

President Henry next called for the report of the general convention committee of which Thomas Finigan is chairman and in his absence Secretary Burritt abstracted the report. This was largely a statement of the meetings and transactions of the committee. The sum of \$2,500 was appropriated for the expenses of the exhibit committee and \$5,500 for the use of the entertainment committee. The report contained an itemized account of how most of this money was expended. The report also stated that 57,392 sq. ft. of space had been sold for exhibit purposes to 142 manufacturing companies. Also as a result of the work of the membership committee 218 manufacturing companies were enrolled as members. This report was accepted and approved.

H. H. Norris, associate editor *ELECTRIC RAILWAY JOURNAL*, chairman of the education committee, then briefed the printed report of his committee which was largely presented as information.

#### EDUCATION

The committee on education reported progress with the correspondence courses which have been in use since last year and gave statistics as to the number of students who had completed the several sections of each course. The courses, in which no material changes have been made since last year, comprise the electrical shop course, the mechanical shop course, the combination of these two courses, the line and track work course, the power-house and substation course, and the combination of the last-named two. The power-house and substation course is the most popular, with seventy-five students enrolled, and the electrical shop course is next with fifty-two students.

The committee reported the results of a canvass of students and employers to learn as to the practical results of the courses from the points of view of both. Both employers and students believed that the courses should be continued. A number of interesting comments on the courses were secured from students and in the report the committee took up in some detail some of the more important of these. In view of the year's experience it was recommended that the courses be continued for another year, that an effort be made to enlist the co-operation of employers in supervising the work of students as suggested by several managers, and that the committee work out some plan for familiarizing the students with appropriate parts of the Engineering Manual. The report was signed by H. H. Norris, chairman; H. A. Bullock, Martin Schreiber, W. L. Robb, A. M. Buck and V. Karapetoff.

At this point in the program President Henry read a telegram from Major-General Leonard A. Wood, New York City, expressing regret because he could not attend the convention. In his stead Walter King Wilson, captain of the coast artillery corps, read a paper on coast defenses. An abstract follows.

#### COAST DEFENSES

The first purpose of coast fortifications is to free the navy, which should be able to go out on the high seas to meet the enemy's fleet and destroy it. The second purpose is to protect naval bases and anchorages where the battleships can be under the protection of the coast guns. A third purpose is to prevent the bombardment of important seacoast cities. The fourth purpose is to protect the harbors which otherwise might be used by the enemy as a base of operation. To prevent a landing at unfortified places along the coast, sea-coast guns mounted on railroad cars would have to be used to be run from point to point along the coast line to be used against ships covering such a landing. For this service all existing railways which are available would no doubt be needed. Many large electric railways connect many of the fortifications with nearby cities, and the co-operation of the management of these railways with the military authorities would be essential for the efficiency of the sea-coast armament. Moreover, in time of war, when our harbor boats are being used for planting mines and for other purposes which are strictly military, the electric railways which connect our fortifications with nearby cities would be of vital importance in transporting supplies. Captain King then showed a series of stereopticon views and pictures to illustrate modern coast defenses and the actual firing of guns, mortars and mines.

At the conclusion of Captain Wilson's address, Lieut.-Col. Chauncey B. Baker of the Quartermaster's Corps read a paper on the "Employment of Trolley and Electric Transportation in Military Service."

In this paper, Colonel Baker first described the importance of sufficient means of transportation in military movements, as shown not only in this country but in Europe. During the recent movement of troops to the border a system was employed arranged between the office of the quartermaster general and the officers of the American Railway Association, the latter working through a committee known as the Special Committee on Co-operation with the Military Authorities. This committee established its headquarters in Washington where it was in constant consultation and communication with the military authorities. The results were very satisfactory.

The steam railroads are at an advantage, however, for military purposes over the electric roads inasmuch as their business makes it necessary for them to exchange traffic with one another, and all of the machinery for this purpose is in existence. To utilize the electric roads satisfactorily and effectively in connection with the military movements an advisory body or bodies should be formed from organizations already in existence whose duty it would be to bring to a uniform practice all of the roads at least in what might be called military districts upon the following points, (1) military tariffs, (2) settlement of accounts, (3) operation of the roads, (4) track and yard facilities, (5) collection of data, (6) reserve corps.

The tariffs should cover all classes of military requirements including every class of equipment required in military service. Such tariffs have been arranged between the government and the steam roads during each period when our country has been at war. Similarly, there should be a clear understanding with regard to the settlement of accounts. As regards operation, pro-



vision should be made for operating all of the lines as a single system so that the cars could go wherever it would be found most advantageous to the military service. This work should also include the preparation of schedules and an understanding of the extent to which commercial traffic will be suspended and the military traffic given the right-of-way. Studies should also be made of each district covering all points connected with operation, including trackage, spurs and side-tracks, terminals and grades.

In providing for track and yard facilities, mobilization, concentration and probable embarkation points should be fixed. They should be so located as to have thoroughly satisfactory service by rail and should be owned by the government. Then the necessary facilities at entraining and detraining points can be provided. Another important function of the committee suggested would be to collect all information of military value concerning the railroads, including the preparation of plans for prompt conversion of existing cars into that class of cars that would be most urgently needed at time of mobilization. Finally, there should be a liberal number of electric railway men who would be willing to place their services at the disposition of the war department for joining the reserve corps. Members of this corps would have duties similar to those which they perform in time of peace in commercial traffic. They would receive, however, such military training as would be necessary. It is believed that the nominations for positions in such a corps should be passed upon by a proper body of this organization. The suggestions made require no new and radical legislation.

#### OTHER BUSINESS

At the close of Colonel Baker's paper J. J. Stanley, president of the Cleveland Railway Company, Cleveland, Ohio, moved a rising vote of thanks be presented to these United States army officers for attending the convention and presenting their interesting papers. President Henry then read telegrams from Gen. George H. Harries, expressing regret at his inability to be present and stating that the committee preparing plans for co-operation with the War Department would complete its report in a month. A. W. Brady, president Union Traction Company, Anderson, Ind., chairman of the committee on federal relations, read its report.

#### FEDERAL RELATIONS

According to the report of the committee on federal relations, the session of Congress recently ended was fruitful of legislative measures affecting the electric railways of the country. These measures touched on numerous phases of electric railway affairs, as reviewed in detail in the report. They applied to the cars operated, to the tracks over which those cars are run, and to the signals by which they are protected; to the clearances between cars and other objects; to the hours of service of the motormen and conductors running the cars and of the dispatchers governing their movements; to the wages paid; to the settlement of differences between company and employee, and to the compensation of employees when injured; to the rules of operation; to the rates chargeable, and to the stocks, bonds and other securities which the electric railways might issue. In the case of the street railways of the District of Columbia such measures even provided for the taking over and operation of those properties by the public, a proposition upon which, the report states, there is a possibility of ill-considered action on the part of the House of Representatives. The report also mentions the Newlands resolution for an investigation concerning transportation lines and government ownership, and

court decisions relative to the jurisdiction of the Interstate Commerce Commission over electric lines.

The report emphasizes the point that the influence of every member of the association should be actively exerted whenever opportunity occurs to secure sound and reasonable action touching electric railway affairs by Congress and the Interstate Commerce Commission. It is said that few companies, when they consider the rapidly widening field of federal activities and the expanding views concerning the acts which make a carrier one engaged in interstate commerce, can feel assured that they will not eventually find themselves within the scope of the federal legislation. Congress should adopt the principle of excluding electric railways from the operation of the various measures of railway regulation unless there is an especial reason for inclusion. Every bill applying to common carriers by railroad introduced at the recent session (three only excepted) applied to a 20-mile interurban line engaged in interstate commerce equally with the great trunk line railroad systems of the country. That, the report concludes, is wrong. The early legislation bringing carriers within the jurisdiction of the Interstate Commerce Commission with respect to rates, accounts, accidents and like matters of a general nature, was, properly enough, sufficiently broad to include electric railways. The present legislation, however, relates as a rule to details of construction, operation or management, and the defects aimed at are those claimed to exist in connection with steam railroads. Electric railways differ so greatly and in so many important respects from steam railroads that it is seldom safe and is often grossly unreasonable that an act relating to any of these details should put the two into a single class.

The report was signed by A. W. Brady, chairman; E. G. Connette, Geo. H. Harries, E. C. Foster, L. S. Storrs, F. W. Brooks, H. H. Crowell, F. R. Ford, L. S. Cass, F. T. Griffith and H. E. Chubbuck.

At this point President Henry adjourned the meeting with the statement that the remainder of the program intended for the Tuesday morning session would be taken up Wednesday morning.

### Wednesday's Session

The first part of the Wednesday morning session was taken up with the presentation of reports postponed from Tuesday.

#### GOOD ROADS CONGRESS

Gordon Campbell and J. M. Larned, the committee appointed to attend the Sixth American Good Roads Congress and the thirtieth annual convention of the American Road Builders' Association, held in Pittsburgh on Feb. 25, 1916, reported that the committee attended these gatherings and recommended that the Road Builders' Association continue to receive the attention of the American Association.

The two papers of special interest to members of the association were one on "Railway Track Construction in Paved Streets," by R. Keith Compton, chairman paving commission, Baltimore, Md., and one on "The Control of Openings in Pavements," by N. S. Sprague, chief engineer Bureau of Engineering, Pittsburgh, Pa. The first-named paper was discussed by Messrs. Larned and Campbell as representatives of the association.

#### JOINT COMMITTEE ON OVERHEAD AND UNDERGROUND CONSTRUCTION

The report of the representatives of the association on the national joint committee on overhead and under-



ground line construction consisted simply of a statement, made by the president, to the effect that the national committee is making progress with the work which it has on hand.

#### COST OF PROVIDING PASSENGER TRANSPORTATION SERVICE

The committee on cost of passenger transportation service reported the completion of the book by F. W. Doolittle which formed part of its report last year. Other work accomplished by the Bureau of Fare Research, while it was in existence, was the establishment of a filing system for financial information, now a part of the general files of the association, the collection of information and the supply of data for several committees of the association, and the preparation of a number of signed articles, editorials, reviews and comments for the press. The total expenditures by the Bureau of Fare Research during the twenty months of its existence were \$10,477, of which \$6,802 was contributed by the association and \$3,675 was raised by subscriptions that were received from five electric railway companies.

The report was signed by J. D. Mortimer, chairman of the committee.

#### COMPANY MEMBERSHIP AND ELECTROLYSIS

The report of the committee on company membership was next received by title. This was in the nature of a statistical statement showing that fifteen railway companies and 208 manufacturers had joined during the year, the present membership being 357 railways and 208 manufacturers.

For the committee on electrolysis, President Henry stated that this committee had met during the year and suggested a number of changes in the report of the American electrolysis committee, most of which have been accepted by the latter committee. The report of the American electrolysis committee is now in galley form and will be completed soon.

#### AWARD OF MEDAL FOR BEST PAPER PRESENTED BEFORE A COMPANY SECTION

The committee appointed to select the best paper read before a company section, based on its value to the electric railway industry, reported that it had carefully reviewed the twelve papers submitted, and in the unanimous opinion of the committee the medal for the year 1916 should be awarded to Bert Hall of the Milwaukee Electric Railway & Light Company for his paper, entitled "Employees' Co-operative Activities," presented before Company Section No. 1 on May 26, 1916. This paper was abstracted in the issue of the *ELECTRIC RAILWAY JOURNAL* for Sept. 9, 1916, page 441.

The committee also selected for honorable mention the paper entitled "Snow Fighting," by Harold Bates of the Connecticut Company, and "Construction Accounting and Its Relations to Other Departments," by H. N. Balfour of the Connecticut Company, the papers having been presented before Company Section No. 7 on Jan. 4, 1916, and April 4, 1916, respectively. These papers were abstracted in the issues of the *ELECTRIC RAILWAY JOURNAL* for Jan. 22, page 162, and April 22, 1916, page 770, respectively. The report was signed by H. R. Fehr, chairman; P. S. Arkwright and James H. McGraw.

On behalf of the committee Mr. McGraw said that the committee believes strongly in the possibility of the company section movement and wished to do everything possible to encourage it. In Mr. Hall's absence, the medal was presented by Mr. McGraw on behalf of

the association and the committee and was received by R. B. Stearns, general manager Milwaukee Electric Railway & Light Company. Mr. Stearns accepted it in a short speech, in which he suggested that Mr. Bradley's paper on "Training Men for Supervisory and Executive Positions" furnished excellent material for company section consideration. He suggested that this paper be divided into, say, a dozen sections for consideration at a corresponding number of company section meetings.

#### CONDITIONS OF AWARD OF THE ANTHONY J. BRADY SAFETY MEDAL

The next report received was that of the committee on the conditions of award of the Anthony N. Brady safety medal, and was presented by Arthur W. Brady, Union Traction Company of Indiana, Anderson, Ind. The report stated that the conditions of the competition remained substantially as heretofore but that there has been a change in the forms supplied for filing data by competitors. Formerly booklets and application forms were furnished separately. This caused some confusion, and as the committee wished to get as many data as possible to supplement numeral statistics, the new form was devised. The actual award of the medal was made by the American Museum of Safety on the recommendation of a committee appointed by the Museum.

#### PAPER ON OVERHEAD CHARGES

The report of the committee on valuation was then presented by P. J. Kealy. This report was accepted. Mr. Kealy also presented by title his paper on "Overhead Charges in Valuation," which had been prepared in consultation with the committee on valuation. He stated that he did not read this, as the paper was already in print and the subject is one of limited interest. He said that many seem to want to postpone consideration of the subject until it is absolutely necessary, but all companies should be prepared to have their properties valued. Mr. Kealy's paper is abstracted elsewhere in this issue.

#### VALUATION

During the year the committee on valuation decided to confine its activities to three things, as follows: (1) The production of a bibliography, brought up to Jan. 1, 1916; (2) the preparation of a code of definitions for the terms necessarily used in valuation work, and (3) a paper to be prepared on "Overhead Charges."

The bibliography was prepared by the library of the American Society of Civil Engineers, which had published the most recent and comprehensive one, and was published by the American Electric Railway Association early in this year. A copy was sent to each member company, and additional copies are available at a nominal price in the office of the secretary.

One of the causes contributing to the widely diversified decisions of commissions and courts on the various phases of valuation work has been the great confusion in the use of terms. A list of more than 300 various terms in use was prepared by C. G. Young, and an examination of this list discloses the fact that there are seventy-four kinds of value, and similarly other terms are used in many ways. The committee felt that if a code of definitions, twenty or thirty in number, could be formulated and generally agreed upon, it would be a long step toward the placing of valuation work and literature on a scientific basis. Such a code was therefore prepared by the committee and is attached to its report as Appendix "A."



The twenty-one definitions proposed include the following:

1. **Public Utility:** A business operated under a public grant and performing a stipulated public service for compensation.

2. **Franchise:** The grant by a public authority of the necessary rights to do a specific business, and including the use and occupancy of some portion of the public lands.

3. **Property:** That which is owned by a company or individual by virtue of legal rights through possession, title or lease.

4. **Ownership:** The legal title to, or possession of, property.

5. **Value:** Worth (see definition of worth).

6. **Valuation:** Act of determining worth.

7. **Worth:** Exchangeable value (Webster).

Including every item of value entering into and affecting the value of a property, tangible and intangible, physical and non-physical, also every kind of value from whatsoever sources derived, or by whatsoever means or cause affected, favorable or unfavorable, and as of the present time and including full consideration of past performance and future probability.

NOTES.—(a) It is seen that worth (value) is not constant, but is affected and increased or diminished from time to time by a number of conditions and circumstances.

(b) That worth (value) is dependent, among other things, on earnings and therefore on rates and tariffs charged for the services rendered.

(c) That worth (valuation) thus defined cannot be made the basis of the amount on which a reasonable return is to be allowed by courts.

(d) That an appraisal only shows a part of the worth of a property.

(e) The word "value" should not be used except when worth is intended.

8. **Investment:** The total amount of cash, or its equivalent, that has gone into the creation and development of a property, from whatsoever source derived, including new money used for obsolescence and development.

9. **Capital:** The total number of shares of a company, preferred, ordinary or otherwise.

NOTES.—When these shares have a stipulated par or face amount, the total aggregate sum expresses the capital of the company.

(a) The capital face amount of a company may be more or less than the investment, and is divided into more or less shares for convenience of increasing or decreasing the fractional partnership divisions.

(b) Capital shares have no fixed relation to the investment.

10. **Sinking fund:** An accumulative fund, set aside from earnings from year to year, out of which monies are paid for amortization of investment.

11. **Amortization:** The repayment from time to time of part of the investment by means of a sinking fund.

12. **Obsolescence:** The state of becoming obsolete (Webster). The replacement of property before it has reached its full period of usefulness due to,

(a) The advance of or changes in the art or process in practice, or

(b) Public legislation or demand.

13. **Depreciation:** Is the lessening in worth of physical property due to use or other causes.

14. **Appreciation:** The increased worth of any part of a property not due to additions to investment.

15. **Maintenance:** The cost of repairs and renewals for proper up-keep of a property. Maintenance is of two kinds:

(a) **Ordinary Maintenance.**—Those repairs which are made each year as needed.

(b) **Deferred Maintenance.**—Those repairs which cannot economically be made each year but which are made at frequent intervals.

NOTE.—Maintenance is a part of the cost of operation.

16. **Rate of return:** The percentage rate of return earned and paid on the total investment.

17. **Tariff rates:** The charges made and collected for services rendered.

NOTE.—The theory being that the rates should be sufficient to cover all operating expenses, repairs and maintenance, depreciation, obsolescence, rewards of management, legal expenses, accidents, insurance, taxes, and general overhead and miscellaneous expenses; also a stipulated amount for amortization and sinking fund, interest on bonds and other forms of indebtedness, and dividends to cover the rate of return allowable on the total investment.

18. **Inventory:** The count or measure of all separate items comprised in a property, including physical property as well as certificates or other evidences of ownership.

19. **Appraisal:** A complete study of a property showing the cost to reproduce new, based on inventory, and also showing depreciation.

NOTE.—An appraisal is but one of the factors to be considered in determining worth.

20. **Intangibles:** Such items of value of a non-physical nature which are not represented in the existent property but reasonably constitute a definite part of the assets of a corporate enterprise, such as contractual rights (franchise value), expenses incurred in development of plant or business, damages resulting from condemnation proceedings, etc.

21. **Overhead costs:** Such general and miscellaneous expenditures, forming a portion of the cost of a property, which, because of their nature, are not or cannot be included in the unit prices.

The report also includes a glossary of terms previously used by Bion J. Arnold (Transactions American Society of Civil Engineers, 1915), and definitions used by John W. Alvord (*Ibid.*, Vol. 79, 1915). Appendix "B" of the committee report consists of the paper on "Overhead Charges" prepared by Mr. Kealy and indorsed by the committee.

The report was signed by J. N. Shannahan, chairman; P. J. Kealy, H. H. Crowell, B. E. Tilton, C. S. Sergeant, W. H. Sawyer, C. G. Young and Martin Schrieber.

#### COMPENSATION FOR THE CARRYING OF UNITED STATES MAIL

The committee on compensation for carrying United States mail devoted particular attention to the Post-office Department appropriation bill and the reasons for the reduction in the allowance for the carrying of mails by electric and cable cars over that made last year. It seems that the Post-office Department estimated as necessary for its requirements for the fiscal year ending June 30, 1917, an appropriation of \$316,364,879. After the bill had passed the Senate and the House of Representatives and points of disagreement had been eliminated by a committee of conference, it carried a total appropriation of \$322,206,579 or \$5,841,700 in excess of the amount asked for by the Post-office Department.

The committee quoted these matters in detail to show that the department is sufficiently supplied with funds to carry on its affairs, to pay its employees, and also to pay the corporations with which it does business a reasonable amount for services rendered. While it would ordinarily be taken for granted that the electric railways should receive some benefit from the increases allowed in the bill a careful analysis shows quite the contrary.

This year's appropriation for inland transportation of mail by electric and cable cars is \$600,000 as against \$784,000 for last year, and this notwithstanding the fact that there must be a normal increase in the carrying of mails by electric and cable cars over last year. The matter was taken up by the committee with the Senate members of the post-office committee to see if an amendment could not be made to the post-office bill when under consideration in the Senate, at least allowing electric railway and cable car companies the same amount of compensation for the fiscal year ending June 30, 1917, as was allowed for the fiscal year ending June 30, 1916, but this result could not be accomplished by the committee.

The committee particularly emphasized the difference in the situation between electric railway and cable companies and the railroad companies. The latter are represented by a very efficient committee headed by Ralph Peters, president of the Long Island Railroad. In spite of discouragement and opposition, this committee persisted in its efforts, and the bill as passed increased by \$3,112,000 the appropriation for inland transportation of mail by railroad companies. The railroad mail service was allowed an increase of \$304,610. The committee in charge of the railroads' interests is, there-



fore, to be congratulated upon the effective campaign which it has carried on.

The reason for the reduction of allowances for carrying mail by electric and cable cars is, apparently, the expectation that automobiles will be increasingly used. Second Assistant Postmaster General Praeger has estimated the cost of carrying mail in automobiles at 15 cents per mile as against 21 cents per mile by electric cars. While assenting to Mr. Praeger's estimate of the cost of transportation by electric cars, the American Association committee disagrees with him as to the cost of automobile service. However, the post-office committees of the House and Senate have apparently followed to the letter the recommendations of the Post-office Department in reference to the carrying of mail by electric and cable railway companies, and these companies must either go out of the business of transporting the United States mail or continue to carry it for less than cost as they are now doing.

The committee calls attention to certain amendments to the post-office bill, particularly that giving the right of appeal to the Interstate Commerce Commission in matters of dispute between the Post-office Department and the railroad companies. The bill further provides for methods for modifications in weights and zones in the parcel post by referring the same to the Interstate Commerce Commission. This commission, therefore, will hereafter enter prominently into disputes as regards rates, space, zones and like matters. It would seem that under such a provision electric railway companies might have a chance for appeal.

In conclusion the committee recommended that a special study be made as to the right of electric railways to appeal as suggested above, and that if necessary the incoming committee be authorized to consult with legal advisors and ascertain what increase from the Post-office Department the electric railway companies can receive for carrying the United States mail by appealing to the Interstate Commerce Commission. It is further recommended that a special study be made of the need of electric railway companies in this respect and that their case be brought before the post-office committee at the next session of Congress. Particularly should the cost of automobile operation for carrying mail be ascertained to see how closely the figures of cost as given by Mr. Praeger have been adhered to.

This report was signed by Henry S. Lyons, chairman; George H. Harries, A. R. Piper, R. S. Goff and S. W. Ladd.

#### COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

The committee on company sections and individual membership reported that during the last fiscal years 900 company section and other individual members have been added to the roll. The committee's efforts were directed toward forming new company sections, and four were inaugurated, namely: No. 7, the Connecticut Company at New Haven on Dec. 7, 1915; No. 8, Capital Traction Company at Washington on Jan. 13, 1916; No. 9, Cumberland County Power & Light Company at Portland, Me., Feb. 18, 1916; No. 10, Newport News & Hampton Railway, Gas & Electric Company at Hampton, Va., March 31, 1916. All are in healthy condition and enthusiastic in their work. The committee has planned to have an exhibit at the convention, known as a company section booth, showing the activities of these company sections.

The individual membership in round numbers consists as follows: American, 195; Accountants, 250; Claims, 125; Engineering, 1555; T. & T., 875; making a total of 3000. About half of this membership is made

up from the company sections. The individual members, other than those of the company sections, are more uncertain in their tenure of membership, and the new members scarcely offset the withdrawals for various reasons. The committee believes that the real field for increasing individual membership lies in the formation of new company sections.

The report was signed by Martin Schreiber chairman; F. W. Bacon, J. E. Gibson, E. V. Blair and Henry H. Norris.

In commenting on the total membership, which is stated at 3000 in the report, Mr. Schreiber said that 100 new memberships had been added since the printed report had been prepared. In the discussion which followed, J. D. Mortimer, Milwaukee Railway & Light Company, inquired concerning the effect of the company section movement on the finances of the association. President Henry replied that it had created a net loss of about \$3,000 and that this was largely due to the reduction in the membership fee for company section members from \$5 to \$2.

In reply to a question from Leake Carraway, Southern Public Utilities Company, Charlotte, N. C., asking whether companies owning several properties in a territory several hundred miles wide could establish with profit a single company section, L. S. Storrs, The Connecticut Company, New Haven, Conn., responded that this plan had worked out satisfactorily on his property and that where only a few department heads were members of the association prior to the organization of the company section there were now 230 such members. In response to another inquiry, Mr. Schreiber stated that approximately one-half of the members included in the 72 per cent increase in membership came into the association when the dues were reduced to \$2. This concluded the discussion and the report was received and placed on file.

#### PUBLIC RELATIONS

C. Loomis Allen, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., then outlined briefly the work of the committee on public relations. Commenting on this, he called particular attention to the marked increase and number of company publications which had been started in the past year.

The committee on public relations reported that it had held several meetings during the year and that at the meeting of Dec. 15, 1915, the following sub-committees were decided upon:

Sub-committee No. 1—Dealing with the dissemination of information or literature on subjects of general interest to public service corporations and sources of public education; members, Guy E. Tripp, chairman; T. S. Williams, E. W. Rice, Jr., and J. D. Mortimer.

Sub-committee No. 2—Dealing with similar committees of other public service associations; members, James H. McGraw, chairman; H. H. Vreeland and J. R. Lovejoy.

Sub-committee No. 3—Dealing with the publication in magazines and periodicals of popular articles on public service questions; members, T. S. Williams, chairman; T. S. Wheelwright and A. W. Brady.

Sub-committee No. 4—Dealing with questions of economic relations between employees, employer and the public; members, James D. Mortimer, chairman; H. G. Bradlee and E. W. Rice, Jr.

Quoting from the 1914 report of the committee on public relations, the following was given as the plan outlined for future work of the committee to be carried out as opportunity offered. Briefly the measures proposed were:



1. The establishment under the auspices of the association of a bureau of public relations.
2. The dissemination of information in literature on subjects of general importance to public service corporations.
3. Co-operation with similar committees of other public service associations.
4. Influencing sources of public education.
5. The publication in magazines and periodicals of signed popular articles upon public service questions, by prominent workers in the electric railway industry.
6. Newspaper advertising when financially possible and advisable.

The committee pointed out that during the year 1915 a director of the bureau of public relations was appointed and syllabi of lecture courses both for technical and for popular uses were drawn up. The committee, however, was without means to pursue this work and no definite steps were taken to carry the recommendation into effect. At its first meeting the present committee raised among its members the sum of \$1,950 for the preliminary work intrusted to it. Later an attempt was made to raise the fund to \$25,000 per year for three years, but without success although pledges amounting to \$14,200 were secured. In view of failure to secure the pledge required, the committee decided not to proceed with the program.

Very careful consideration was given to the proposition of a national campaign of publicity having for its object the presentation of the salient facts in connection with the industry, and the information of the general public as to the conditions which the electric railways of the country confront. There was presented to the committee a carefully considered and worked-out plan for a national campaign of publicity, in which use was to be made of the national advertising mediums, of street car advertisements, and of the facilities that member companies have for the distribution of literature. The committee expressed itself as of the opinion that the plans so outlined were the best that had yet been called to its attention along these lines. The committee concluded, however, that while the problem of public relations has a national aspect, yet in working out improved conditions, the unit is the member company, and that the general advertising or publicity campaign involving the expenditure of a large sum of money (\$500,000 at the least) would not bring results commensurate with the expense. The committee and the association, however, can be of great value to the industry as a whole and to the member companies, in the collection and dissemination of information along certain lines—such, for instance, as that which is being undertaken by subcommittee No. 4, which presented a report of progress, and by supplying member companies with material for their local campaigns. For a comparatively small sum, a bureau could be equipped which will be of great value to the electric railways.

In the report attention was directed to the constantly increasing number of railway companies which are issuing periodicals of one kind or another for the information of the public, and for their employees, and of those companies which, through newspaper advertising, and in other ways, are working to secure the co-operation of the public. There is no organization existing in the country which has such facilities for supplying the material useful in such a campaign as the American Electric Railway Association. To place this information at the disposal of the member companies and to add to the channels by which the information is secured, would be the province of such a bureau.

The committee was, therefore, of the opinion that its

efforts should be directed to the raising of the necessary funds for carrying this project into effect. Its cost would be comparatively slight and the value of its work would increase with years.

If it is possible—and in the committee's opinion it is possible—to secure the necessary revenue, outside of the dues of member companies, the following plan of procedure was proposed: (1) The engaging of a director, who shall, under the direction of the bureau of the committee on public relations, have charge of the work of the bureau, devoting all of his time thereto. (2) The preparation and distribution among member companies of absolutely authentic and attractively prepared information bearing on matters concerning public relations—to include the important features of public utility commission decisions; the utterances of public officers and of other authorities affecting public relations; statistics showing the tendency of railway earnings and capitalization accounts, and all other matters of interest in connection with public relations. (3) The director of the bureau to assist member companies in securing speakers to present the case of the electric railways before various commercial and civic bodies. (4) The supplying of articles and information to newspapers and periodicals upon public utility affairs. (5) The preparation of any material which member companies may desire in matters affecting public relations.

The above report was signed by C. Loomis Allen, chairman; T. S. Williams, J. D. Mortimer, J. H. McGraw, Guy E. Tripp, S. M. Curwen, E. W. Rice, Jr., J. K. Choate, Frank Hedley, Chas. N. Black, T. S. Wheelwright, Henry A. Blair, Arthur W. Brady, E. G. Connette, Geo. E. Hamilton, H. G. Bradlee, H. H. Vreeland, C. C. Peirce and P. F. Sullivan.

#### SOCIAL RELATIONS

J. D. Mortimer, Milwaukee Electric Railway & Light Company, then read extracts from an extensive report prepared by the subcommittee on social relations. This report discusses the principles of life, health and accident insurance, pensions, etc. At the conclusion of his presentation of this report Mr. Mortimer said that an installment on minimum wage was in the process of publication at the present time and would be ready for distribution shortly. Owing to the extent of the report of the subcommittee on social relations, its publication is omitted this week but it is hoped to include an extended abstract of it in the issue of next week.

#### IVY L. LEE SPEAKS ON PUBLICITY

At this point Ivy L. Lee, New York, was introduced and addressed the association on the subject of publicity. In his preliminary remarks Mr. Lee stated that his address would be in the form of an abstract of a paper which will be published in full later. The sudden appreciation that the public was taking an interest in the direction of all business was the reason for publicity. Electric railway companies in particular are carrying a heavy burden in the way of paving regulations which cost the company much money which the city should pay. Taxes have become excessive and an era of carelessness has increased the number of personal injury accidents. Superimposed upon this, the railways are confronted with an increased cost of materials, jitney competition, an inherited financial past in many cases from which they are unable to escape, and finally they have been limited to a 5-cent fare.

Publicity is a remedy for many of these difficulties, but it is not a shield against unfavorable opinion. To change the metaphor, it should be considered as an anti-



septic to cure the disease rather than a bandage to cover up a sore. Or, to change the metaphor again, publicity is not a coat to cover up defects but an x-ray by which the public can really see what is inside the organization.

A company which inaugurates a publicity campaign must be prepared to take the consequences, because publicity cuts both ways. Unless the railway management is willing to tell everything, the publicity campaign had better not be started. A company cannot sing of prosperity to its stockholders and complain of poverty to its employees and to the tax assessors. Moreover, any policy of publicity should be pursued in a reasonable way, and if this is done the facts presented will cause the public to believe that the railway is doing the best it can to make good. In presenting such facts the railway must realize that the people as a whole are intelligent and fair and that when they have in their possession all of the facts regarding the situation, they will decide in the just way in the long run.

The public as a rule is moved by sentiment. A railway cannot expect to reason out its case with the public because it is not interested enough to analyze facts and figures. The best plan undoubtedly is to induce the people to believe in the management. How this should be done and the proper policy to pursue must be worked out by each company to meet its own local conditions. In other words, the management in each city must convince its public to believe that it is doing the best it can in the way of furnishing service. Often, of course, better service means an expenditure of more money, but that is not always the case. Courtesy to the public on the part of the employee is the first essential to better service. Courtesy in handling complaints and frankness in explaining the facts of any situation are always helpful in improving public relations. Finally, Mr. Lee suggested that it might be well to publish what he termed a "kicker's" bulletin, in which both complaints and the company's answers appear.

Another phase of the publicity problem is the personal attitude of the company toward the community served. If the public is led to believe the company is a machine without sympathy, it is inclined to deal more harshly with it than when it knows the management personally and favorably. A case in point is the past and present situation on the New Haven road. While the present service perhaps is no better than that of the past on this railroad, President Elliott has impressed his public with his desire to give them the best service possible and has gained their sympathy thereby. In publicity matters Mr. Lee did not believe that a manager should be primarily a talker but a doer, and this involved an attitude of open-mindedness. Here Mr. Lee criticized the kind of publicity used to eliminate jitney competition. He said that simply because the jitney bus could not be a financial success it did not cease to be of interest to the public. It supplied a demand which the railway did not furnish, and the only way to meet its competition was by giving a similar service, even if at a higher fare. He also mentioned the London Underground competition with auto-buses, and how their competition was turned into an asset by developing the auto-bus as a feeder service of its own.

Mr. Lee then took up the importance of being sympathetic especially in the case of accidents. The reports of accidents are in many cases too heartless. How much better some evidence of sympathy in these reports would be to both the company and the public. He also stated that the railway management must first of all be good citizens. He mentioned the attitude of the Western Union Telegraph Company when the question of government ownership was raised. It took the position that

it did not know whether it was a good thing or not but believed that in case the government took over the property it would be fairly compensated. In the meantime it proceeded to furnish the best service it could. Such policy should be adopted in the street railroad contest. Frequently the public takes good service for granted and only complains when the service is not up to the standard. A railway should not hesitate to tell its story in printer's ink. Such stories, however, should contain human interest facts and not be a mere mass of argument and detail.

In any publicity campaign, Mr. Lee urged the railways to be human, be natural, and speak in the language of the people. At this point he offered a compliment to Billy Sunday at his methods of preaching the gospel. In dealing with many public problems, it is wise to avoid the services of lawyers. He said that he had seen many situations spoiled by the intervention of lawyers. Too often the legal mind disregards the people's tribunal. It is always best to let the people know that they are dealing with human beings. In publicity matters it is always a wise policy to tell the news first whether it is good or bad. Through the proper form of publicity even the 5-cent fare can be over-ridden. The public wants the service, and if it can't be furnished for a 5-cent fare it must be taught why this cannot be done.

In conclusion, he urged the railway management to take the newspapers into their confidence on a frank and candid basis. Free service to them creates suspicion. Charge them for a service they receive and pay them for the service that they render. The great value of advertising space in the publicity campaign is that the railway commands its own copy and location in the newspaper. Finally, to be and to do does more than to say in building up public confidence. A railway must believe that it is absolutely right when it goes into a publicity campaign if it expects to win.

In reply to an inquiry about the extent to which confidence in the public had been borne out, Mr. Lee stated that the attitude of most people is that they do not care very much about the other fellow's troubles so long as they are not affected. Nevertheless, he had great confidence in the desire of the American people to do the fair thing when they knew what it was. A presentation of the facts dissolves criticism in some cases, but it does not in others. In the final analysis, however, a railway must believe in the people; if the people cannot be trusted to be fair, the American democratic form of government is in danger.

James H. McGraw, *ELECTRIC RAILWAY JOURNAL*, inquired whether Mr. Lee knew of any publicity campaigns, based upon a frank statement of the facts, which had not won out. Mr. Lee replied that he did not know of any such campaigns that had failed except where the campaigns had been started too late. In response to another inquiry, he said that the abolishment of the "ambulance chaser" lawyer was a difficult problem, but that it was much worse for the railway to conceal the facts in regarding an accident. The policy of willingness to tell the press and any legitimate inquirer what they had a right to know tends to disarm them.

Leake Carraway, Southern Public Utilities Company, Charlotte, N. C., then inquired whether publicity matters should be left in the hands of an executive who is not a trained newspaper man or should he employ a man especially fitted to that work and direct the activities. He believed that executives are frequently so busy that they do not give the question of publicity the attention it should receive. Mr. Lee replied that the reason for his presentation of the subject of publicity at this time was based upon his opinion that the railway executives were not giving it sufficient attention. Re-



garding procedure, he said that the president of the Pennsylvania Railroad never talked for publication orally, but always gave out interviews and opinions in writing. He believed that this was an excellent policy, but that it could not be followed to the letter and was not by the president of the Pennsylvania Railroad, because he was neither undemocratic nor unapproachable. When a railway employs a publicity man it should not do so because he has a wide acquaintance among the local newspaper men, but he should be employed for his technical knowledge and ability.

T. A. Wright, Wilkes-Barre (Pa.) Railway, said that about a year ago a strike was begun on his property and was still in progress. In order to contest this condition he had hired a trained publicity man, because he was of the opinion that publicity afforded the only means of reaching the public and gaining its confidence. In handling this publicity campaign, however, the newspapers had refused to accept some of his advertising material because 85 per cent of the labor territory was unionized and the newspapers feared for their circulation. Mr. Mortimer also mentioned a peculiar situation in Milwaukee, Wis., where his publicity department was so well organized that the opposition complained that the railway had subsidized the press.

Mr. Lee said that both of these questions were germane. Mr. Wright's situation was similar to the publicity campaign conducted by the steam railroads, where circular matter was largely used and proved very effective. In any publicity campaign it is wise to obtain a published expression of opinion from the opposition and trust to the soundness of one's own case. In any event, the argument in any contest must stand on the facts that if they are presented in the right way the public will make a just decision.

T. N. McCarter, Public Service Railway, Newark, N. J., asked whether Mr. Lee believed that if a railway showed that it could not earn a return on its investment would any amount of publicity help it to increase the rate of fare? In reply Mr. Lee said that he felt confident that it could obtain such a result in the long run if it had a good case.

Chief Engineer C. M. Larson of the Wisconsin Railroad Commission said that the commission had found that frequently the cases against public utilities were not representative of the public but were pushed by radicals. The public would be satisfied with much less than was demanded by these radicals, and the only way it could be reached personally was through a publicity campaign.

The discussion was closed by J. H. Pardee, J. G. White & Company, Inc., New York.

#### OTHER BUSINESS

H. C. Donecker, Public Service Railway, Newark, N. J., then presented the report of the Aera advisory committee, which was approved and then filed. President Henry next called attention to the changes in the constitution and by-laws, which he said were made necessary following the rather hasty action at the mid-year meeting in Chicago. These amendments were adopted without discussion. The report on motor vehicles was next submitted, approved and filed. In the absence of A. H. Ford, Cumberland County Power & Light Company, Portland, Me., and chairman of the committee on insurance, H. J. Davies abstracted the report, which was received and filed. The reports of the committees on standards for carloading and street traffic also received brief consideration, and the report of the committee conferring with the United States Bureau of Standards on the National Safety Code was postponed for consideration at a later meeting. Abstracts of these reports except that on insurance ap-

pear below. After the reports had been presented the meeting adjourned.

#### "AERA" ADVISORY BOARD

In its report the Aera advisory board stated that the names of 336 railway men appear in the list of contributors to Vol. IV of the association magazine which was completed with the issue of last July. Of the number mentioned 257 contributed to the question box section, in which during the year there were published 1479 answers to 216 questions. The circulation of the magazine has grown to more than 6000 copies per issue.

The report points out the importance of the magazine to the growth of the company section movement, which the board believes to be only at its start, and particular attention has been paid to company sections in the magazine. Section papers and addresses have been printed when they were of more than local interest. It has been the policy to appeal to company section members not only through the department devoted to the movement, but in the editorial and other sections of the magazine.

The report also directs attention to the expansion of the work in the additional space devoted to association news, the publication of statistics of electric railways and of synopses of important decisions of commission and courts affecting electric railways, and the extension of the scope of the department devoted to the interests of the manufacturers in the membership.

The report was signed by H. C. Donecker, chairman; T. P. Kilfoyle, John Lindall, R. E. MacDougall, H. A. Nicholl, Thomas Finigan and C. C. Peirce.

#### CHANGE IN CONSTITUTION AND BY-LAWS

The committee on changes in the constitution and by-laws of the American Association was requested by President Henry, with the sanction of the executive committee, to study and report upon the desirability of modifying the scale of dues of manufacturing companies so as to render more equable the gradations in the scale. A report, signed by George H. Harries, chairman; R. I. Todd and E. B. Burritt, was presented to the executive committee and approved on Sept. 5. The approved report was transmitted to the association by the executive committee.

Under the old scale, a company with gross receipts of \$100,000 was required to pay the same dues as a company earning \$1,000,000, and similar wide gradations prevailed throughout the scale. The new scale provides for minimum dues of \$25 to apply to companies with net earnings under \$250,000. The dues of companies having gross receipts in excess of this sum is to be according to the following scale:

Gross Receipts		Annual Dues
Between \$250,000 and	\$500,000	\$37.50
Between 500,000 and	1,000,000	50.00
Between 1,000,000 and	2,000,000	75.00
Between 2,000,000 and	3,000,000	100.00
Between 3,000,000 and	4,000,000	125.00
Between 4,000,000 and	5,000,000	150.00
Between 5,000,000 and	6,000,000	175.00
Between 6,000,000 and	7,000,000	200.00
Between 7,000,000 and	8,000,000	225.00
Between 8,000,000 and	9,000,000	250.00
Between 9,000,000 and	10,000,000	275.00
\$10,000,000 and over		300.00

The above scale is the same as that of dues paid by electric railways, and in order to incorporate it in the by-laws the committee recommended the amendment of Section XIV so as to include manufacturers with railway company members. Under the new scale some manufacturing company members will pay less, some will pay more, and the remainder will pay the dues provided in the old schedule.

#### OPERATION OF MOTOR VEHICLES

The subject assigned to this committee was the motor bus as distinct from the type of automobile known as



the jitney, and it was considered, as a feeder, auxiliary or competitor of electric railways. A great deal of interesting data on the cost of motor-bus operation was collected and is presented in an appendix. The conclusions reached by the committee from these data are briefly as follows:

The motor passenger bus has two distinct fields, one in direct competition with city or interurban lines and one where it acts as a feeder to such lines or serves some community at a distance from steam, electric or water transportation. For the former service, the rate of fare is practically limited to the rate of fare obtaining on existing transportation lines, and in these circumstances these bus routes cannot be commercially successful, as shown by the operating costs and demonstrated by the long list of failures. Where there is no competition, higher rates can be established so that it may be possible to run such a line at a reasonable profit providing there is sufficient business and the rate of fare is not prohibitively high. These instances are so few as to be negligible.

The difficulties of motor-bus operation are further increased by the rapid depreciation of the equipment, owing to bad roads, and the difficulty of securing the services of reliable and careful men in their operation. Generally speaking, they are unable to exist if obliged to comply with regulatory laws such as electric railways are required to operate under, or to submit to similar taxation or other municipal charges.

The development of the gasoline motor truck for hauling freight, express and produce is another phase of the possibilities of the gas engine as affecting existing transportation companies. Where the roads and weather conditions are favorable, this form of operation is making an impression upon the earnings of electric and steam lines, and it is quite probable that the motor truck for freight will develop, first, as a competitor to existing transportation lines and second, as a feeder for them. The committee, however, has not had an opportunity to make a comprehensive study of this particular part of the subject.

In the appendix, information is given about sixty-eight routes for motor buses that have been put in operation. A number of these have not proved profitable and have been discontinued. An important exception is the Fifth Avenue Coach Company, whose earnings are given as 35.29 cents per bus-mile and expenses 24.6 cents per bus-mile with a 10-cent fare for between 6 and 7 miles. Figures are also given of the estimated cost of operation per seat-mile for motor buses, based on cars of five different types and prices, *i.e.*, from a \$500 four-passenger car to a \$4,000 twenty-two passenger car. The sum of the fixed charges and operating expenses per seat-mile are estimated to be from 0.95 cent to 2.42 cents.

#### STANDARDS FOR CAR LOADING

The committee on standards for car loading presented a very brief report. It had been found inadvisable to publish or attempt to formulate any standards because of the varied and complex conditions under which most of the member companies operate, so the committee had simply made a study of the standards which had been attempted by railroads and governing bodies. The result of this study has been filed with the secretary for the use of member companies. The data contain not only the orders formulating the standards, but so far as it has been possible to obtain it, testimony leading up to such orders in court decisions where such orders had been contested in the courts.

The committee consisted of S. W. Huff, chairman; E. J. Dickson, E. J. Cook and W. F. Ham.

## Thursday's Session

The final session of the American Association was opened with the report of the committee to confer with the United States Bureau of Standards in matters relating to the Safety Code. This was presented by W. J. Harvie, Syracuse & Suburban Railroad, Syracuse, N. Y. After making brief reference to the contents of the report, he said that the committee recommended that the Engineering Association study the application of the safety code and recommend the changes desirable. The executives of the various member companies should advise themselves concerning the results of their study, through their respective engineers, and keep the American Association advised. President Henry indorsed this recommendation, and urged the members to apply with the recommendations committee.

#### TAXATION

Henry S. Lyons, Boston Elevated Railway, Boston, Mass., then presented the report of the committee on taxation matters.

This report gave the number of states (32) in which no legislative sessions were held during the year 1915-1916, the number (eight) in which there was no taxation legislation affecting electric railways, and the number (six) in which the legislatures passed laws on this subject. These states were California, Illinois, Massachusetts, New York, South Carolina and Virginia. Legislation was also passed by the Dominion of Canada and Manitoba. Abstracts of the provisions in this legislation are given in the report.

The committee says that in view of the unusual conditions in Canada on account of the war, it is unable to make any suggestions relative to the situation in that country. It finds, however, in the United States that there seems to be no inclination on the part of the states nor of the municipalities to lighten the burden of street railway companies. On the other hand, they are constantly imposing additional burdens. The committee calls attention to the fact that legislatures of every state in the Union, except Mississippi, will hold a session during the year 1917. If the companies in the various states are desirous of obtaining release from some of their burdens, the committee suggests that they begin to make preparation for such action.

The report is signed by Henry S. Lyons, chairman.

After presenting this report Mr. Lyons said that it was of utmost importance for members to keep in close touch with legislative bodies to prevent them from adding more paving burdens. He mentioned a situation which developed in Boston, where the Legislature requested the Public Service Commission to investigate the question of paving as it affected the street railway. Under the law, this company paid the cost of laying and maintaining paving between the rails and 18 in. outside. As a result of the commission's investigation it was recommended that the city install the pavement and keep it in repair, and submit an annual bill to the company. This recommendation was defeated in the Legislature through the efforts of the company.

President Henry then read letters from C. G. Clegg, the Oakwood Street Railway, Dayton, Ohio; Jere C. Hutchins, formerly president of the Detroit United Railway, Detroit, Mich.; John I. Beggs, formerly president of the Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; H. H. Vreeland, a former president of the association; W. Caryl Ely and Gen. George H. Harries. All of these had been especially invited to attend this session of the American Association.



Just before introducing the next speaker, President Henry said that the total registration up to Wednesday night was 2938, as compared with 2454 of two years ago. This increased registration was equally distributed among all of the affiliated bodies. Frank J. Sprague, New York, was then introduced, and addressed the association on the engineering development of electric railways. On his taking the platform he was given a rising reception. He gave a review of electric railway development, published in abstract on another page. It was illustrated by lantern slides.

He was followed by D. W. Nevin, Mayor of Easton, Pa., who spoke of the difficulties of early electric railway promotion.

#### MR. LEACH'S ADDRESS

A. B. Leach, A. B. Leach & Co., New York, was next introduced, and he addressed the association on the financial development of electric railways. After paying a high compliment to Mr. Sprague for his vision and great courage in the development of electric railway equipment, he opened his address with the statement that bankers stand in the market place only by what they can sell. The public has a dual relation with the railway, first as an investor and second as the public in commanding service. He next took up publicity and its value as an aid in solving public-utility problems. Mr. Leach was of the opinion that the railways do not press home the fact that they increase values. He said that the public did not appreciate this, nor the great obstacles which had to be overcome and paid for out of the fares. They continued to have burdens, and a case in point was the pavement. The cost of installation and maintenance of pavement, an outgrowth of horse-car days, did not belong to electric railways. This fact could be presented to the public in an understandable way. When the public demands service it should be reminded of the railway problem in obtaining the additional capital. The public is made aware of the railway difficulties. Better treatment can be expected. In spite of the destructive regulations with which practically every railway company has had to contend, Mr. Leach still had an abiding trust in the fairmindedness of the people. Too many misstatements of facts had been made in submitting the railway's side of the case to them, and this undoubtedly had prejudiced the public in many cases. When the public is convinced that better service means the obtaining of more money from a doubting public it would be more lenient.

Mr. Leach next predicted that the rate on the money necessary for future capital requirements would be higher in the future unless it can be shown that the investment is absolutely safe. New capital cannot be readily obtained as long as the reputation of street and interurban companies is that they are operating on a too narrow-margined profit. Furthermore, railways must obtain more reasonable treatment, or it will be practically impossible to obtain new capital. They must also establish the fact that the industry is on a fair and reasonable basis.

Unless additional money can be had for improvements, public ownership of railways is the only solution. A greater menace could not be brought into this country than public ownership of public utilities. The country has been built upon the theory of individualism, as symbolized in the record of the achievements of Mr. Sprague. Public ownership kills individualism, the best thing that America holds. Through it America has developed many useful things. In conclusion, Mr. Leach summed up his remarks by stating that a material change in public sentiment must be obtained by a fair statement of facts, and street

railways must be put on a basis that will insure safe investment.

After the conclusion of Mr. Leach's address it was expected that a number of pioneers in electric railway development would speak briefly, but as the hour was late it was decided by vote to request these gentlemen to make written contributions to the discussion.

#### OTHER BUSINESS

Speaking for the committee on recommendations that was referred to in the president's address, J. J. Stanley, Cleveland Railways, read the following:

"Your committee, appointed to consider the recommendation of the president of the association in his address at the opening of the convention, with respect to the election of two representatives of the manufacturers to sit as members of the executive committee until the final plans are matured and provided to carry out the intention of the association in the admission of manufacturing companies, recommends that the president's recommendation be carried out, and, to that end, that the nominating committee select the names of five representatives of the manufacturers who have heretofore joined the parent association. We further recommend that before final action is taken with respect to permanent ways and means to preserve the continuation of the manufacturers' interests and their representation, that the member manufacturers be requested to confer with and advise the executive committee of their wishes in the premises on or before the next midwinter meeting, if possible. If not, at the earliest practicable date." [Signed] John J. Stanley, R. B. Stearns, L. J. Drake, Jr. (chairman).

The committee on resolutions presented a memorial to the members who had died during the year, and also expressed appreciation of the efforts of all who had contributed to make the convention so great a success. A special resolution referred to the work of the technical press.

The committee on nominations submitted the names of the following, who were duly elected: For president, L. S. Storrs, the Connecticut Company, New Haven, Conn.; for first vice-president, T. S. Williams, president Brooklyn Rapid Transit System; for second vice-president, John J. Stanley, president Cleveland Railways; for third vice-president, J. H. Pardee, president Eastern Pennsylvania Railways, Pottsville, Pa.; for fourth vice-president, Richard McCulloch, president United Railways of St. Louis.

To carry out the recommendations of the committee on recommendations in the president's address, the committee submitted the following nominations for members of the executive committee, ad interim: Thomas Finigan, manager of sales, American Brake Shoe & Foundry Company, San Francisco, Cal.; James H. McGraw, president McGraw Publishing Company, New York; S. E. Curwen, president J. G. Brill Company, Philadelphia, Pa.; E. W. Rice, Jr., president General Electric Company, Schenectady, N. Y.; and Guy E. Tripp, chairman of the board of directors, Westinghouse Electric & Manufacturing Company, New York. This report was signed by A. W. Brady, J. R. Lovejoy, L. J. Drake, Jr., C. Loomis Allen, T. N. McCarter (chairman).

As there was no unfinished business, the secretary was instructed to cast a unanimous ballot of the meeting for the nominating committee's ticket, which he did. President Henry then asked the officers-elect to come forward, after which he declared the convention adjourned, stating that it was the best convention which the American Electric Railway Association had ever held.



# Meetings of Accountants' Association



PRESIDENT T. P. KILFOYLE

Accountants Listen to Views of Outside Experts on Matters Relating to Valuation, National Franchise Issues, Accounting Fallacies and the Sphere of Modern Accounting—Separate Statistical Department Said to Be Step Forward—Joint Committees on Engineering-Accounting and Claims-Accounting Make Laudable Progress

THE sessions of the Accountants' Association, which began on Monday afternoon, Oct. 9, and lasted up to and including Thursday afternoon, Oct. 12, had to do mostly with questions of general interest in the field of electric railway accounting. Joint sessions with the Engineering Association, the Transportation & Traffic Association and the Claims Association covered matters along the lines of valuation, prepayment systems and other traffic points, and classification of claims. The papers at the several sessions took up such points as the work of the modern statistician, commission valuation for rate-making purposes, commission accounting inconsistencies, the federal census of electrical industries, national issues in local street railway franchises and the part played by accounting in the development of modern industry.

## PRESIDENT KILFOYLE'S ADDRESS

The opening session was called to order at 2.45 p. m. on Monday by President T. P. Kilfoyle, Cleveland Railway. In his annual address, President Kilfoyle referred to the death on May 7 of George G. Whitney, third vice-president, and to the resignation of H. B. Culloden, and to the appointment by the executive committee of I. A. May, The Connecticut Company, to fill the vacancy caused by the resignation of Mr. Culloden, and John J. Landers, York Railways, to fill the vacancy caused by the death of Mr. Whitney. He also spoke about the importance of committee work and urged the support and co-operation of all the members. He considered it their duty to accept appointments when tendered. Moreover, he suggested that officers who do good work should be continued in office and promoted if possible so long as their interest in the work continued. The only office to which a member should not be re-elected, in his opinion, was that of president. He felt, too, that it would be desirable to have some plan whereby the association could hold semi-annual meetings, and also recommended a closer relationship with the National Electric Light Association. In conclusion, he extended his sincere thanks to the officers and committee members for their co-operation during the year.

After the president's address the secretary of the association, M. R. Boylan, Public Service Railway, Newark, N. J., read the report of the executive committee and his own report as secretary-treasurer. The first report showed that the membership of 129 on Nov. 1, 1915, had been increased by four new members and twelve reinstated members to a total of 145, but that

## PROGRAM

### MONDAY

Annual Address of the President.  
Annual Report of the Executive Committee.  
Annual Report of the Secretary-Treasurer.  
Reports of committees:  
Accounting Definitions—John J. Landers, chairman.  
Standard Classification of Accounts—H. L. Wilson, chairman.  
Representing Association at Convention of Railroad Commissioners—W. F. Ham, chairman.  
PAPER—"The Statistician," W. E. Jones, statistician.  
PAPER—"Commission Valuation of Public Service Properties for Purposes of Rate Regulation," John E. Benton.

### TUESDAY

Joint Session with Engineering Association.  
Reports of committees:  
Engineering-Accounting—F. H. Sillick and L. P. Crecelius, co-chairmen.  
Life of Railway Physical Property—R. N. Wallis and Martin Schreiber, co-chairmen.  
AFTER JOINT SESSION  
ADDRESS—"Commission Accounting Inconsistencies," by Homer A. Dunn.  
PAPER—"The Federal Census of Electrical Industries," by William M. Steuart.

### WEDNESDAY

Joint Session with Transportation.  
Reports of committees:  
Cost of Rush Hour Service—J. V. Sullivan, chairman.  
Fares and Transfers—C. S. Ching, chairman.  
PREPAYMENT SYSTEMS—General discussion.  
Reports of committees:  
Express and freight traffic—F. D. Nodviel, chairman.  
ADDRESS—"Some National Issues in Local Street Railway Franchises," Prof. Clyde L. King.

### THURSDAY

Joint Session with Claims' Association.  
Reports of committees:  
Claims Accounting—H. J. Davies and H. K. Bennett, co-chairmen.  
AFTER JOINT SESSION  
ADDRESS—"The Part Which Accounting Has Played in the Development of Modern Industry," Prof. John R. Wildman.  
Reports of convention committees:  
Resolutions.  
Nominations.  
Election of officers.  
Installation of officers.

resignations and deaths totaled eleven and charges to company sections fifty-four, making a total loss of sixty-five and leaving a net total on Sept. 30, 1916, of eighty members. A statement of the company section membership showed 113 new members and fifty-four changed from the individual membership list, making a total of 167 members. The appropriation of \$1,500 for the use of the Accountants' Association was more than enough to cover all expenditures for the year ended Aug. 31, 1916, amounting to \$893.

President Kilfoyle then appointed a committee on resolutions consisting of W. G. Nicholson, Omaha & Council Bluffs Street Railway; T. B. McRae, Chicago Elevated Railways, and H. L. Sanders, Cincinnati Traction Company; and also a committee on nominations composed of the following past-presidents: W. H. Forse, Jr., Union Traction Company of Indiana; C. F. Mitchell, Pittsburgh Railways; H. J. Davies, Cleveland Railway; W. J. Ham, Washington Railway & Electric Company, and H. L. Wilson, Boston Elevated Railway.

## COMMITTEE REPORTS SUBMITTED

Reports were then read for the committee on accounting definitions, by Mr. Landers; the committee on the standard classification of accounts, by Mr. Wilson; and



the committee on representing the association at the convention of the National Association of Railway Commissioners, by Secretary Boylan. These reports were in general accepted by the association in the form submitted.

Acting on the recommendation made last year, the committee on accounting definitions called on the American Association of Public Accountants and secured the report of its committee on accounting terminology with the list of words and definitions as accepted a year ago by that association. This list, which is included in an appendix of the report of the committee on accounting definitions, contains definitions of greater interest to those concerned with general industrial accounting than to electric railway auditors, for which reason it is not reproduced herewith. In its report the committee made a request for terms which in the opinion of members should be included in a list of definitions and exchanged with the committee of the Association of Public Accountants. The report was signed by John J. Landers, chairman; George A. Harris, S. C. Stivers and J. G. Dobbins.

According to the report of the committee on standard classification of accounts, many cases were submitted to it during the year by the association, through the Interstate Commerce Commission or directly. The committee could not place its decisions before the member companies except through the publications in the electric railway field, and it therefore urged electric railway auditors to watch these. The Interstate Commerce Commission could not publish a bulletin frequently to cover accounting decisions, but the committee hoped that there would soon be a bulletin out to follow No. 9. The committee stated that while the text of the standard classification of accounts was not perfect, it had proved of great value and use to all interested in utility accounting and the financial statements of the electric railways of the country. The report was signed by H. L. Wilson, chairman; W. F. Ham, W. H. Forse, Jr., R. N. Wallis and P. S. Young.

The members of the committee representing the Accountants' Association at the convention of the National Association of Railway Commissioners held at San Francisco on Oct. 12-15, 1915, found no matters presented which required any special effort on their part. A report of the committee on statistics and accounts of electric railways, however, was presented at that convention and can be secured by those interested from the printed proceedings of the National Association of Railway Commissioners. The report to the Accountants' Association was signed by B. W. Fernald, G. D. Willcutt and W. A. Culloden, who acted as alternates at San Francisco for P. S. Young, C. L. S. Tingley and W. F. Ham, respectively.

After Secretary Boylan had read a report of a special committee on resolutions in regard to the late George D. Whitney, the papers scheduled for the afternoon were taken up. These papers, one by W. E. Jones, statistician The Connecticut Company, New Haven, Conn., on the subject of "The Statistician," and the other by John E. Benton, former member New Hampshire Public Service Commission, Keene, N. H., on "Commission Valuation of Public Service Properties for Purposes of Rate Regulation" are published in abstract elsewhere in this issue. At the conclusion of Mr. Benton's paper, a vote of thanks was moved to both speakers and the session was adjourned.

## Tuesday's Session

The first part of the work of the Accountants' Association on Tuesday was given over to a joint session with the Engineering Association, called to order at 2.30 p. m. with Presidents Lindall and Kilfoyle in the chair. Two committee reports were considered, one on engineering accounting, which was read by Co-chairman L. P. Crecelius, Cleveland Railway, and one on the life of railway physical property, which was presented by Martin Schreiber, Public Service Railway, Newark.

The latter report stated that in the committee's opinion there was no reason to believe that greater success would now be met with in trying to collect experience data regarding the life of physical property than had been the case in connection with prior reports, and that such data would have the same restrictions on their worth as they would have had then. Moreover, in view of the existence of a valuation committee of the parent association, it was thought that the committee on the life of railway physical property possibly should be discontinued in order to avoid duplication of work, or that if continued its work should be defined so as to avoid conflict. It was decided, as recommended, to put the question of the continuance of the committee up to the executive committees of the associations that were concerned in the matter.

## ENGINEERING-ACCOUNTING

The joint committee on engineering-accounting had assigned to it three subjects, as follows: (1) Interdepartmental charges; (2) consideration of the subdivision of accounts covering steam power station costs, as submitted by the 1915 committee on power generation, and (3) development of a property ledger looking toward the maintenance of a continuous inventory, this subject to be considered as applying to the entire physical property.

Inventory Department Continuous Inventory Ledger														
Original Date of Acquisition or Installation										Section No. 206				
Property Statement										Unit No. 506				
Year	No. of Units	Description	Total Cost	Annual Depreciation Amount	Accumulated Depreciation Amount	Total Present Value	Installed Added to or Bettered	Retired or Replaced	Amount to be Added to or Deducted from Total Cost	Corrected Total Cost	Total Present Value Based on Depreciation to Date	Present Value of Property Retained or Replaced	Present Value of Property of Useless Property	Amount to be Added to or Deducted from Total Present Value
1916	500	Electric Street Cars	100000	10000	10000	90000								
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some instances it might be desirable to attach drawings or sketches, such as for special work layouts, parcels of land, etc. This form provides in the upper left-hand corner spaces for location data, and in the upper right-hand corner spaces for page number, section number and date. Instructions at the top state: "Give below a detailed description of section. If track, give type and weight of rail, kinds of ties, ballast, etc.; if land, detailed description of property; if overhead work, size of wire, and kind, etc.; if structure, size, type, etc. Where practicable, plans should be made, the size of this sheet, further to describe property and filed herewith in description loose-leaf binders."

All these detailed report forms made out by the various departments should, in the committee's opinion, be bound and kept by the inventory department in loose-leaf binders. In this way the original signed record is always at hand for reference.

#### CARD INDEX FOR READY REFERENCE

To complete this system properly, it was considered advisable to show a card index system by which any unit might be readily found either in the ledger or in the volumes for the other forms. The card system was divided under six headings, one for each class of property as represented by the six forms previously mentioned. One of the six cards, which it was proposed to file in duplicate under these headings, is shown in Form III on page 615.

In all cases, with the exception of "Equipment" and "Land," one set of cards is filed alphabetically by locations, with alphabet subtab cards under tab cards bearing the name of the unit. The unit may be as small as desirable, and if the classification used does not give a fine enough subdivision, some such scheme as annexing a subletter to the account number may be used. Under all six headings the second filing of cards is numerically by section numbers, with number tab cards. Of course, it will be seen that when a power station, for example, is taken as a section, there will be a number of cards bearing the same section number, but a different unit number, and all cards bearing the same section number should be filed together in the numerical order of the unit number.

As to the "Equipment" index, it was thought desirable to cross-index numerically by car numbers with subtab cards, under tab cards bearing name of the unit. For example, if it is desired to find the electrical equipment of car No. 1267, this will appear in numerical order of the car number under the tab card "Electrical Equipment." Because of the fact that it may not be desirable to use the car number as a number designating this sectional part of the equipment, as itemized in the ledger, but rather instead use a section number as in all other cases, these "Equipment" cards are planned to be filed in duplicate, the same as in the other five cases. The only difference in the "Land" index is that in the alphabetical filing, the tab cards bear the name of town or tax district instead of unit.

#### SEPARATE INVENTORY DEPARTMENT RECOMMENDED

It seemed to the committee that to handle and maintain properly such a system for a continuous inventory as outlined, a separate department should be created. The man in charge of this department should have a certain practical knowledge of engineering and accounting, and at the same time be more or less familiar with the physical characteristics of railway property. The cost of maintaining such a department and the number of men required will, of course, depend upon the size of the property and the extent to which the various units are subdivided.

The report was signed by F. H. Sillick and L. P. Crecelius, co-chairman; B. E. Bramble, C. H. Lahr, J. C. Collins, H. A. Gidney, Harold Bates, Norman Litchfield, J. P. Ripley and E. P. Roundey.

#### DISCUSSION ON ENGINEERING-ACCOUNTING FINDINGS

The discussion on the engineering-accounting report was opened by Edwin Gruhl, North American Company, New York, N. Y., who stated that too little attention had been paid to the perfection of details for property accounts. At the present time, owing to questions arising in connection with depreciation, valuation and the like, there were increasing opportunities for the use of such accounts in their most complete form. In his opinion, however, the report as presented by the committee was complicated, and a careful analysis of its fundamentals would have to be made before his company could recommend it for use by its various properties.

In the first place, Mr. Gruhl thought that the idea of a separate department for handling a continuous inventory was impracticable, for many records of original entry that would have to be used must at the same time be available for the accounting department. In his opinion a practicable system must provide for a department adjoined to the accounting department, with perhaps some visé by the engineering or construction department concerned in the work. In the second place, he criticized the portion of the report stating that sections or units to be used in the inventory would be optional with the various companies, and he suggested that the committee would do well to indicate the units for a moderately small company and a moderately large company. He felt, too, that the question of the proper units might well be extended to cover the question of where a line of demarcation should be drawn between maintenance and renewals.

Furthermore, as the third point deserving criticism he mentioned the provision for accrued depreciation in the property ledger, stating that the keeping of such a record would necessitate an enormous number of entries each year and the arbitrary writing down of the property. Studies had shown that depreciation depended upon other factors than age, so that the arbitrary calculation of accrued depreciation upon a life basis would cause the property ledger to show values misrepresenting actual conditions. A cause of especial complications would be scrap values, for the price of scrap varied considerably and this would upset all fine-spun considerations as to how much accrued depreciation existed in an item of property. Lastly, he stated that the report straddled the fence on the question of cost versus value. Accounting had always adhered strictly to actual costs and not estimates of value, and when a property ledger disclosed and divided the costs and associated them with the proper units, all had been accomplished that could be expected.

Mr. Schreiber took up first the question of interdepartmental charges and stated that without doubt such charges would involve a large amount of work and would upset the books. Engineers, however, should estimate such charges in comparing the cost of internal shop work with outside costs, and the auditing department and the purchasing agent should co-operate to see that such charges were fully considered in such cases so that no one should be misled as to the advisability of the company doing its own work. In regard to the property ledger section of the report, Mr. Schreiber observed that it practically assumed definite life tables for property, which the committee on the life of railway physical property had never favored. In his opinion, there was a serious question as to the worth of such an assump-



tion. The time to consider depreciation was when a question demanding such consideration arose, for the subject involved too many variables for it to be settled in advance. In general, he felt that a ledger along the line submitted was very desirable and that the committee had accomplished much in the way of getting the work started.

Mr. Forse considered that the committee had blocked out the subject well and that the report was a good basis for future work. He suggested that the committee in formulating the property ledger consider the report for betterments and additions required by the Interstate Commerce Commission. He saw no reason why there should be a separate department to handle a continuous inventory, in view of the existing co-operation of engineering and accounting forces, and he thought that a separate department would not be needed unless the company were engaged in valuation work and needed a large staff for that purpose.

C. R. Harte, The Connecticut Company, New Haven, Conn., mentioned the fact that the valuation work now being done by the Interstate Commerce Commission for steam railroads would probably be extended to electric railways and that when the federal government and the states had come to a conclusion as to what principles would be applied in steam railroad valuation, the same ones would without doubt be applied also to intrastate properties. If it were decided that original cost should predominate in valuation findings, it would be highly important that companies should have charged in all interdepartmental items so that a company which did its own work should not be made to suffer, by having lower rates imposed upon it, in comparison with a company which contracted out all its work. Mr. Creelius explained that the object of the property ledger was to provide the cost of all unit sections with due consideration of all factors in such cost, and that the difficulty in using interdepartmental charges was in connection with accounting for the credit of overhead charges to the department doing the work. Harold Bates, also of The Connecticut Company, stated that the complications in the report would depend upon the number of units that each company decided to use, that the property ledger had included a column for accrued depreciation simply because some companies had seemed to desire to show present value, and that the joint work in connection with a continuous inventory could be handled more understandingly by a separate department headed by a man having both an engineering and an accounting knowledge.

Harry E. Carver, assistant engineer in charge of appraisals, Board of Public Utility Commissioners of New Jersey, stated in a written discussion that the report of the committee outlined a system which would probably give excellent results if carried out, but that it could be simplified to save expense. His discussion made the following four points:

1. No place was provided on the property ledger, or summary sheet, by which term it might also be designated, to show from what detailed sheet the information was assembled. This appeared to be a very important omission. In lieu of this a rather elaborate system of card indices was suggested in order to locate various items in the inventory. If this information was desired for a certain item, at least the account in which it should be included was known or could readily be determined. The summary sheet for all property should show the sheets from which the total for the account in question had been derived, and these sheets should show the preliminary sheets from which the data there contained was found. In other words, if proper use were made of the system of accounts as a subject index and

proper references were used in making up inventory sheets, a further system of referencing should be unnecessary except for such items as might be included in the inventory in groups. For items like rolling stock equipment, track special work, etc., card or individual records of some kind kept at present could probably be made an integral part of the inventory system. A list might also be made of various items which should be included under each account, and arranged alphabetically in order readily to classify them if this should appear desirable.

2. In the forms submitted it was proposed to identify the various sheets by a section number, a unite number and a sheet number. The "unit number" was evidently intended to be in practically all cases the account number or subdivision of a particular account, and the term "account number" would be more suggestive and would better be used. Moreover, data referring to one account only should be placed on any one sheet, except the summary sheet or sheets containing general information, which might be classified under Account No. 1 or some other number not referring to a particular account. If a holding company operating a number of different subsidiaries were involved, it would probably be advisable to substitute "file number" for the term "section number" to denote the company, and to designate the section or particular subdivision of any one company by a series of sheet numbers using as many series as desired with an index of each account. In many, if not all, cases the same series of sheet numbers in the various accounts could be used for the same section. If it should afterward prove that an insufficient number of sheets were allowed, a decimal could be used before and after the numbers. By combining a letter with the sheet number a separate and distinctive number could easily be given to each and every inventory sheet that might be in reference to any company in the state for a period of twenty-five to fifty years.

3. The forms suggested provided for the computation of the accrued depreciation for each item. While this would be useful information to have, and information which the federal or state commissions would probably be delighted to have a company keep, there was some question as to the advisability of making these detailed computations on each sheet. It would seem to be desirable to keep a record of the expected and actual life of each individual item, but the accrued depreciation or the present value of any single item appeared to be of little value except in making up an estimate of the total accrued depreciation or present value for the whole company or for a taxing district or other subdivision. It would probably be less work to make these computations at the time needed when making up a summary as a considerable number of items could probably be grouped for the purposes of computing depreciation.

4. Other problems in this work would involve the proper computation and allocation of labor costs; material costs when a large number of items were included in one contract, storeroom charges, tools and other miscellaneous small items, engineering, supervision, interest during construction, legal expenses, etc. All of these items would enter into the cost of any particular piece of property, and in computing accrued depreciation or in making withdrawals, etc., a proper allowance would have to be made for all of these items.

After this discussion the report of the engineering-accounting committee was accepted and the committee was continued. The meeting was thereupon ended in order that the Engineering Association might hold a joint session with the Transportation & Traffic Association, as reported under the head of the first-named



association, and in order that the Accountants' Association might take up its separate program for the afternoon.

#### MEETING OF THE ACCOUNTANTS

After the joint engineering-accounting session the members of the Accountants' Association listened to a paper on "Commission Accounting Inconsistencies," by Homer A. Dunn of Haskins & Sells, New York, N. Y., and one on "The Federal Census of Electrical Industries," by William M. Steuart, chief statistician for manufactures, Bureau of the Census. These papers are abstracted elsewhere in this issue.

In the discussion of the first paper, F. W. Sweney, chief examiner of accounts Interstate Commerce Commission, took exception to Mr. Dunn's remark that the appropriation accounts might have been devised as a trap for electric railways, and Mr. Ham emphasized the fact that the commission had never tried to trick the companies and that some things regarding the classification which did not seem clear to outside experts might be easily explained by those brought up in the school of practical experience in connection with it. R. N. Wallis, Fitchburg & Leominster Street Railway, Fitchburg, Mass., commented on the frankness of the treatment accorded electric railways by Interstate Commerce Commission representatives. Mr. Sweney said that he appreciated the co-operation of the committee on the standard classification of accounts, for this committee had always presented constructive criticism instead of stopping with destructive criticism as many committees did.

Before reading his paper Mr. Steuart related various details to show the magnitude of the work carried on by the Bureau of the Census—work which costs \$14,000,000 at the time of the regular census and \$1,500,000 in the intervening periods. He suggested that schools should teach more about census work and other governmental activities, and urged the need of greater public co-operation. After the conclusion of his paper a vote of thanks was moved to both speakers of the afternoon and the meeting was adjourned.

### Thursday's Session

The only meeting of the Accountants' Association on Wednesday was a joint session with the Transportation & Traffic Association, which was given over to reports of committees on the cost of rush-hour service, fares and transfers, and express and freight traffic, as well as to a general discussion on prepayment systems and an address on "Some National Issues in Local Street Railway Franchises" by Prof. Clyde L. King, Wharton School of Commerce, University of Pennsylvania. A more extended reference to all of these and the discussion thereon is made elsewhere in this issue in the proceedings of the Transportation & Traffic Association.

On Thursday afternoon the Accountants' Association held a joint meeting with the Claims Association, and afterward finished its individual program for the convention. The sole subject of discussion at the joint meeting was the report of the committee on claims-accounting, which was read by H. J. Davies, Cleveland Railway.

#### CLAIMS-ACCOUNTING

The joint committee on claims-accounting, as a result of the re-commitment by the Claims Association of a report in 1915 on this subject, this year presented a classification of accidents embodying the following groups:

##### 1. Collision with pedestrians.

2. Collisions at railroad crossing other than company's.

3. Collisions between cars of company.

4. Collisions with vehicles and animals:

- |                          |                               |
|--------------------------|-------------------------------|
| (a) Automobiles.         | (d) Horse-drawn vehicles.     |
| (b) Auto trucks.         | (e) Motorcycles and bicycles. |
| (c) Taxi-cabs and buses. | (f) Animals.                  |

5. Derailments.

6. Defective equipment:

- |                        |                          |
|------------------------|--------------------------|
| (a) Spread rail.       | (f) Gear pan dropped.    |
| (b) Broken rail.       | (g) Motor case dropped.  |
| (c) Broken brake beam. | (h) Flashing controller. |
| (d) Broken axle.       | (i) Broken trolley wire. |
| (e) Broken journal.    | (j) Fuse blown out.      |

7. Boarding cars.

8. Injuries on cars (not in collision):

- |                                |                              |
|--------------------------------|------------------------------|
| (a) Due to sudden start.       | (f) Hit by passing object.   |
| (b) Due to sudden stop.        | (g) Hit by passing car.      |
| (c) Going around curve.        | (h) Hit by falling car parts |
| (d) Fall in car over obstacle. | (under defective equipment). |
| (e) Hit by missile.            |                              |

9. Alighting from cars.

10. Falling from cars (not purposely alighting).

11. Stealing rides.

12. Doors, gates and guard rails.

13. Ejectments and disturbances.

14. Clothing damaged.

15. Employee accidents.

16. Miscellaneous.

In commenting upon this outline, the committee stated that it endeavored to make the report broad in its construction and elastic enough for the most exacting company to be enabled to adopt it without confusion. The sixteen main groups, the committee believed, will embrace every accident that any company may ever be called upon to consider, and the divisions under each general head may be added to or taken from to suit individual requirements. Under Group 16, "Miscellaneous," the committee would place broken glass, broken fenders, burst air hose, gear pans and motors dropped, etc. Group 1, "Collisions with Pedestrians," would include every known kind of an accident of that sort. One question the committee was unable to solve and left to the association, this under the heading of "Defective Equipment." It was an open question whether broken rails, brake beams, suspension bars, etc., that cause derailments should be placed under this heading or under "Derailments"—in other words, whether the accident should be cataloged under the primary or secondary clause.

The report was signed by H. J. Davies and H. K. Bennett, co-chairmen; H. V. Brown, J. R. Pratt, G. B. Cade and H. S. Swift.

Acting President R. E. McDougall, New York State Railways, who was in the chair, read a letter from J. H. Handlon, United Railroads of San Francisco, who made numerous suggestions in regard to the recommended classification. H. V. Drown, Public Service Railway, Newark, N. J., stated that the classification was a composite of those used by the various companies, and it came as near to the object to be attained as possible. He believed that member companies should be able to find a way easily to observe the classification in their accounts so as to make possible comparisons with other companies.

Most of the ensuing discussion related to the propriety of certain primary divisions in the classification. President McDougall stated that "Defective Equipment" represented conditions, the accidents resulting from which were mostly covered by other heads, and this might make the classification confusing. W. F.



Weh, Cleveland Railway, was of the opinion that in all cases the primary cause was the one to be considered in applying the classification. He said that while his company did not need primary divisions for "Stealing Rides" and "Clothing Damaged" some companies might find such items important and worthy of inclusion in the primary group.

A. G. Jack, Wilmington & Philadelphia Traction Company, asked why the first six headings under "Defective Equipment" could not be taken out, have "Bad Joints" and "Broken Flanges" added to them, and be placed under the preceding heading of "Derailments," thus leaving the heading of "Defective Equipment" to cover electrical equipment, which was usually the cause of injuries inside the car. Mr. Davies thought that the first six divisions under "Defective Equipment" might be placed under "Derailments," if derailments actually occurred. He thought, however, that it was inadvisable to use the word "defective" in any classification heading, inasmuch as it might seem to present *prima facie* evidence against the management. He suggested that "Equipment" be used as the sole word in the heading. He also brought out the point that the heading, "Accidents to Employees," did not designate the cause of accidents, and that this division should be omitted and the accidents thereunder distributed to the respective causes named or to "Miscellaneous." His opinions were indorsed by W. H. Forse, Jr., Union Traction Company of Indiana. A. H. Kayser, San Diego Electric Railway, thought that the heading of "Clothing Damaged" also did not show cause and could properly be placed under "Miscellaneous." These three

changes were adopted and the amended report was accepted.

#### FINAL SESSION OF ACCOUNTANTS

The only paper scheduled for the final meeting of the accountants following the joint claims-accounting session was one on "The Part Which Accounting Has Played in the Development of Modern Industry," by Prof. John R. Wildman, School of Commerce, Accounts and Finance, New York University. An abstract of this paper is published elsewhere in this issue. After a vote of thanks to Professor Wildman, T. B. McRae, Chicago Elevated Railways, presented the report of the committee on resolutions, containing words of appreciation to all those who had helped to make the convention a success. This was adopted, and then Mr. Forse, for the committee on nominations, presented the following names: President, M. R. Boylan, Public Service Railway, Newark, N. J.; first vice-president, H. B. Cavanaugh, Cleveland, Southwestern & Columbus Railway; second vice-president, I. A. May, The Connecticut Company; third vice-president, John J. Landers, York Railways; and secretary-treasurer, S. C. Rogers, Empire United Railways, Inc. The executive committee nominees were: P. V. Burington, Columbus Railway, Power & Light Company; F. E. Webster, Massachusetts Northeastern Street Railway; F. H. Sillick, Hudson & Manhattan Railroad, New York, N. Y.; and W. G. Nicholson, Omaha & Council Bluffs Street Railway. The secretary was instructed to cast a unanimous ballot for these nominees, and, after short installation speeches, the session was ended.

## Proceedings of the Claims Association



R. E. MCDUGALL

In Four Largely Attended Sessions This Association Discussed the Fundamentals of Claims Work, the Relation of this Work to that of the Operating Departments, and Some of the Larger Questions Upon the Successful Answering of Which Permanence in Accident Reduction Must Be Based. The President Says Time Is Now Ripe for Accident-Prevention Organization.

THE annual meeting of the American Electric Railway Claims Association was opened on Monday afternoon by Acting President R. E. McDougall, claim agent New York State Railways, Rochester, N. Y. A brief abstract of the proceedings only is given this week. Abstracts of the papers presented will follow in a later issue.

#### MONDAY'S SESSION

The Monday afternoon session was called to order at 2.30 by Acting President McDougall, who first delivered his presidential address.

In his presidential address Mr. McDougall stated that with the increase in electric railway business during the last year there had come an even greater increase in the number of accidents, and that the time was now ripe for an active accident-prevention organization. Individual companies in the past have carried an accident

### PROGRAM

#### MONDAY

Annual Address of Acting President.

Annual Report of the Executive Committee.

Annual Report of the Secretary-Treasurer.

Reports of committees:

Employment—B. B. Davis, chairman.

Ways and Means—J. E. Kubu, chairman.

PAPER—"Ohio's Compensation Act." R. C. Green.

Written Discussion—Leonard J. Tynan.

General discussion.

Joint Session with Transportation and Traffic Association.

Reports of committees:

Claims Transportation—R. P. Stevens, chairman.

#### TUESDAY

PAPER—"The Near Side Stop," John J. Reynolds.

Written Discussion—S. B. Hare.

General discussion.

#### WEDNESDAY

PAPER—"Automobile Accidents and Traffic Regulations," by H. G. Winsor.

Written Discussion—A. D. Brown.

General discussion.

PAPER—"Hooper-Holmes Index Bureau," by B. B. Holmes.

#### THURSDAY

Joint Session with Accountants.

Reports of committees:

Claims-Accounting—H. J. Davies and H. K. Bennett, co-chairmen.

PAPER—"Claims Work": Claim Agent—Past, Present and Future, Policies and Principles, Psychology. E. P. Walsh.

Written Discussion—C. G. Rice.

General discussion.

General business.

Election of officers.

Installation of officers.



prevention campaign, but there has been little or no uniformity in the plan followed. Mr. McDougall asked why it would not be possible to get in such campaigns the co-operation of all interested, legislative and executive authorities, utility and industrial corporations, automobile clubs and others.

As a step in this direction Mr. McDougall suggested that a joint claims-transportation committee be appointed to determine what highway-crossing and warning signs could be standardized and where and how they could be placed to render them more efficient. Mr. McDougall also mentioned the indifferent use of the Hooper-Holmes Index Bureau by claim agents, and stated that they were making a mistake in not taking advantage of their opportunity. In conclusion he extended his thanks to the members and committees of the association for their support and help, mentioning particularly B. B. Davis and E. B. Burritt.

After the presentation of the report of the executive committee and the secretary-treasurer, the committees on resolutions and nominations were announced. The latter committee consisted of W. F. Weh, Cleveland, Ohio; H. M. Braun, East St. Louis, Ill.; and C. B. Proctor, Memphis, Tenn.

The committees on ways and means and employment then presented their reports, after which R. C. Green, accident department Cleveland Railway, read a paper on "Ohio's Compensation Act." The discussion, which was very extensive, was led by L. J. Tynan, Public Service Railway, Newark, N. J.

At 4.30 the Association adjourned to hold its joint session with the Transportation & Traffic Association to consider the report of the committee on transportation-accounting. This session is reported under the proceedings of the latter association.

#### TUESDAY'S SESSION

The meeting of the Claims Association on Tuesday afternoon was devoted entirely to a discussion of the relative advantages of the near-side and the far-side stop in electric railway service. The subject was brought before the association by a paper read by John J. Reynolds, claim attorney Boston Elevated Railway, followed by a written discussion by S. B. Hare, claim agent Altoona & Logan Valley Electric Railway.

A large number of those present engaged in the following discussion, the general conclusions reached being that for city traffic the near-side stop is preferable.

Before the conclusion of the session Acting President McDougall announced that besides the paper scheduled for Wednesday's session the association would listen to an address on the Hooper-Holmes Index Bureau from Bayard P. Holmes, president and general manager of the bureau.

#### WEDNESDAY'S SESSION

The meeting of the Claims Association Wednesday afternoon attracted a large attendance, there being more than sixty delegates present. The meeting was largely given up to the paper on automobile accidents and automobile regulation, presented by H. G. Windsor, superintendent of investigation and adjustments Puget Sound Electric Railway. Mr. Windsor's paper was followed by a written discussion by A. D. Brown, claim agent New York State Railways, Syracuse, N. Y., by oral discussions by a number of others. At its close the president suggested the appointment by the incoming executive committee of a special committee to formulate some plan by which the questions brought out in the paper and discussions could be settled.

As the next feature on the program Bayard B.

Holmes, president and general manager Hooper Index Bureau, gave a talk on the bureau and its relations with the Claims Association. Owing to the lateness of the hour, the discussion on Mr. Holmes' talk was postponed until Thursday, when the president requested the members of the Claims Association to express their opinion as to the value of the index bureau, and whether the association is warranted in asking the parent body to continue the service.

A very pleasant feature of the meeting was the presentation to George Carson, claim agent Fifth Avenue Coach Company, New York, of a past president's gold badge, similar to those which have been presented to other past presidents of the association. The presentation came as a matter of great surprise to Mr. Carson. It will be remembered that Mr. Carson was elected president of the Claims Association last October, when he was claim agent of the Seattle Electric Company, but, as he resigned soon after from that company, he became ineligible to hold office in the Claims Association. Consequently, he resigned as president, and Mr. McDougall was appointed as acting president. Mr. Carson has done a great deal of valuable work for the Claims Association in the past, and mention was made of this work when the badge was presented.

#### THURSDAY'S SESSION

Early in the afternoon of Thursday the Claims Association met with the Accountants' Association for consideration of the report of the committee on claims-accounting. This session is reported under the proceedings of the Accountants' Association.

After the joint session, a paper on "Claim Work," by E. P. Walsh, attorney United Railways of St. Louis, was read by C. C. Mullin, Pittsburgh Railways, and was discussed at length by C. G. Rice of the same company.

Resolutions of thanks were next passed recognizing the work of the writers of papers and the subjects committee and the co-operation of the Mutual Information Bureau of Chicago. Officers were then elected as follows:

President, R. E. McDougall, claim agent New York State Railways, Rochester, N. Y.

First vice-president, S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, Altoona, Pa.

Second vice-president, J. J. Reynolds, claim agent Boston Elevated Railway.

Third vice-president, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railway, Gloversville, N. Y.

Secretary-treasurer, B. B. Davis, claim adjuster Columbus (Ohio) Railway, Power & Light Company.

Members of Executive Committee: C. G. Rice, assistant to president Pittsburgh Railways; H. D. Briggs, assistant claim agent Public Service Railway, Newark, N. J.; W. H. Renaud, claim agent New Orleans Railway & Light Company; J. H. Handlon, claim agent United Railroads of San Francisco.

The following committees were also appointed:

Subjects: C. C. Mullins, Pittsburgh Railway; R. C. Green, Cleveland Railway; H. M. Braun, East St. Louis & Suburban Electric Railway, East St. Louis, Ill.; L. J. Tynan, Public Service Railway, Newark, N. J.

Ways and Means: J. S. Kubu, New York State Railways, Utica, N. Y.; J. S. Harrison, Jacksonville (Fla.) Traction Company; L. W. White, Toledo Electric Railway & Light Company.

Employment: B. B. Davis, Columbus (Ohio) Railway Power & Light Company; C. B. Brunner, Easton (Pa.) Traction Company; A. D. Brown, New York State Railways, Syracuse, N. Y.



# Sessions of the Engineering Association



PRESIDENT JOHN LINDALL

The Program of the Engineering Association Consisted Entirely of Committee Reports. These Were Replete with Data and Were Accepted in General with Little Controversy. The Association Plans to Make a Strenuous Effort to Promulgate the Standards and Recommended Practices Which It Has Developed.

THE sessions of the American Electric Railway Engineering Association began on Monday, Oct. 9, 1916. President John Lindall, after calling the meeting to order, delivered the annual presidential address. This in part was as follows:

## PRESIDENT LINDALL'S ADDRESS

"Owing to the abnormal conditions brought about, in part, at least, by the war in Europe, the past year has been one of unusual difficulties. The increased costs and scarcity of materials, the delays in freight transportation, and the conditions of labor have been such as to call for the most strenuous efforts by engineers in order that the railways might continue to be operated, and with some hope of profit. Notwithstanding this the work of the Association has been undertaken with increased energy. The subjects and executive committees were again confronted with more subjects than the standing committees could properly handle. These were carefully assorted but even then there remained a large number deserving of prompt attention. The latter were assigned to the committees with the understanding that they were to investigate and report upon as many as circumstances and time would permit.

"A part of the work of the committees is to review the Association's standards and recommendations. With changing conditions and the advancement of the art such revisions may frequently be necessary, and this part of the work must necessarily require more time. Likewise the committees' work in conjunction with other engineering bodies is extending and requires still more time. To meet this condition, at least in part, it has been suggested that arrangements be made for getting the work started more promptly after the close of the convention. To accelerate the work of the committees the executive committee has taken the steps necessary to enable the incoming officers to appoint committees and assign subjects soon after the close of this convention.

"The question of arousing a larger amount of interest in the use of the association standards and recommendations which are now available was referred to by President Crecelius in his address last year. It must be conceded that if the work of establishing standards and recommendations is properly done it is of very great value to the member companies, providing they make use of it. Not feeling satisfied that the member companies were getting all the value they could from this work, the executive committee caused the appointment of a sub-committee on the use of the asso-

PROGRAM	
MONDAY	
Annual Address of the President.	
Annual Report of the Executive Committee.	
Annual Report of the Secretary-Treasurer.	
Reports of committees:	
Power Distribution—C. L. Cadle, chairman.	
Standards (on recommendations contained in above report).	
Special sub-committee, acting with the committee of the American Institute of Electrical Engineers, on Stranding Tables—W. W. Brown and C. L. Cadle.	
Standards—H. H. Adams, chairman.	
TUESDAY	
Joint Sessions with Accountants.	
Reports of committees:	
Engineering Accounting—F. H. Sillick and L. P. Crecelius, co-chairmen.	
Life of Railway Physical Property—R. N. Wallis, Martin Schreiber, co-chairmen.	
Joint Session with Transportation and Traffic Association.	
Reports of committees:	
Block Signals—J. M. Waldron and J. W. Brown, co-chairmen.	
Standards (on recommendations contained in above report).	
Transportation Engineering—F. R. Phillips and W. A. Carson, co-chairmen.	
WEDNESDAY	
Report of committees:	
Power Generation—J. W. Welsh, chairman.	
Standards (on recommendations contained in above report).	
Way Matters—C. H. Clark, chairman.	
Standards (on recommendations contained in above report).	
American Good Roads Congress—J. M. Larned,	
THURSDAY	
Reports of committees:	
Equipment—W. G. Gove, chairman.	
Standards (on recommendations contained in above report).	
FRIDAY	
Report of committees:	
Buildings and Structures—C. F. Bedwell, chairman.	
Heavy Electric Traction—E. R. Hill, chairman.	
Standards (on recommendations contained in above report).	
Electrolysis—A. S. Richey, chairman.	
General business.	
Report of Committee on Resolutions.	
Report of Committee on Nominations—Paul Winsor, chairman.	
Election of officers.	
Installation of officers.	

ciation standards, and this committee has endeavored to further the use of standards by holding personal interviews with representatives of the railways, and by addressing local railway associations on the subject. They have also caused the matter to be given publicity through the columns of *Aera* and the *ELECTRIC RAILWAY JOURNAL*, and through a circular letter to members. Undoubtedly these efforts will be productive of some good results, but I feel it my duty again to call your attention to the very great importance of close co-operation in the matter by member companies, manufacturers and engineers. Of course, there are conditions which preclude the adoption of standards in some instances, but before dismissing the matter engineers should fully assure themselves that such conditions or reasons exist to such an extent as to outweigh the value of the standard.

"During the year the association has been in active co-operation with the following committees of other associations: American committee on electrolysis; national joint committee on overhead and underground line construction; national joint committee on standardization of method for determining the cost of power; committee on



standard thread for pins and insulators; sub-committee on stranding of the A. I. E. E. committee on standards. In addition, a vast amount of work has been done in connection with the tentative safety code of the United States Bureau of Standards. The slogan 'Safety First' has been well established throughout the country. The work of reducing accident hazard is of great importance to the industry, but it can be carried beyond the point where the end would justify the means, and for that reason, as well as the desire to promote safety, this matter should receive very careful attention.

"The Association's official organ, *Aera*, has now been in existence for five years. That it is growing more valuable each year and that it is quite a necessary adjunct to the work, I am sure you will all agree. It is your publication, and I bespeak for it your hearty support. This does not necessarily mean that you are to become an author, nor does contributing to it require literary talent. You all have individual problems which you work out successfully. You have views on pertinent questions connected with your line of work. To inform your fellow-workers of what you are doing, to express your views through the columns of *Aera* in simple language is a help to the industry and a help to yourself in crystallizing your ideas. The Question Box also offers a very ready means 'for the interchange of ideas, to acquire and distribute information, and to promote uniformity of practices.'

"During the past year our relationship with the manufacturers has undergone a change, and we are this year glad to receive them into full fellowship. To the Engineering Association they have always been of great assistance, and under the new conditions will undoubtedly be more so. On behalf of this association I wish to take this opportunity to thank the manufacturers and their representatives for many favors past and present, and to offer to them a very cordial welcome to full membership in our association."

C. W. Stocks abstracted the report of the executive committee meetings held during the year, and read the report of the secretary-treasurer. This report showed that in 1915 there was a decrease of forty-six in the membership, and that in 1916 there was a further decrease, due in part to the loss of Manufacturers' Association memberships. Some of these memberships were not renewed because the associate members' companies had not joined the American Association. On Sept. 30 the engineering membership totaled 1030. President Lindall then appointed the following committee on resolutions: C. R. Harte, Connecticut Company, New Haven, Conn.; C. E. Fritts, Kansas City (Mo.) Railways, and E. H. Dusen.

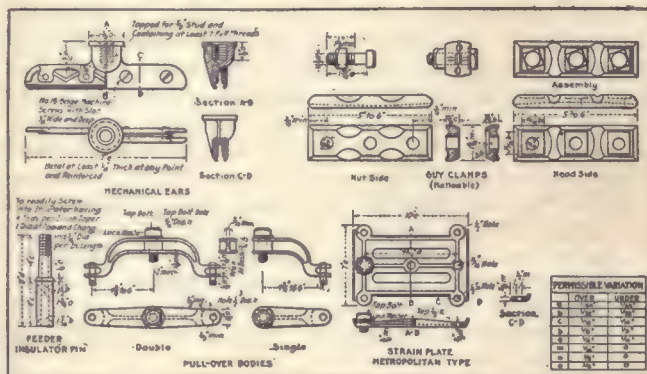
#### POWER DISTRIBUTION REPORT.

C. L. Cadle, chairman, briefed the report of which the following is an abstract, and read the list of eight subjects which had been assigned to the sub-committees on Dec. 17, as follows: Review of existing standards and recommendations, consideration of such of the A. I. E. E. standardization rules as apply to the work of the committee, clearance diagrams for semaphore signals, derivation of deflection formulas and tables for tapered concrete poles, additional specifications for overhead line material, types of third-rail construction and data on twenty-two different installations, collection of data on high-voltage d.c. and catenary trolley construction, and the tentative safety code of the Bureau of Standards in so far as it affects line construction.

The committee stated that the proposed revision of the recommended specification for overhead crossings of electric light and power lines could not be made at this time. The object of the revision is to make the speci-

cation correspond with the work done by the national joint committee on overhead and underground line construction, and this committee is withholding the final revision of its specifications until the Bureau of Standard's safety code is in more permanent shape.

On the subject of the standard specification for rubber insulated wire and cable for power distribution purposes, the committee submitted a new table of temperature coefficients, the values in which are the reciprocals of the coefficients given in the original table. This gives a mul-



HALF SIZE REPRODUCTION OF SAMPLE PLATE SHOWING DETAILS OF OVERHEAD LINE MATERIAL

tiplying coefficient instead of a dividing one, thus making test computations a little easier. The coefficients were also specified definitely instead of the maximum and minimum limits being given. A new table was recommended for the required thickness of lead sheaths for cables, and it was recommended that the table giving the minimum number of wires in the conductor be revised to conform to the A. I. E. E. standard stranding.

The committee suggested certain changes in the A. I. E. E. definitions applying to the height and gage of third-rails. As to the suggestion of having a more definite dividing line between the transmission system, the distribution system and the substation, it was thought that this might lead to confusion and was therefore undesirable. The remainder of the A. I. E. E. rules considered were reported to be satisfactory.

Two diagrams were submitted and recommended for approval showing the location of signal masts and semaphores with reference to trolley poles, etc., for use on interurban roads. The diagrams covered the cases



PROTECTED, SIDE-CONTACT THIRD-RAIL CONSTRUCTION

where trainmen were allowed to climb up the side and ride on the top of the car and where they are not allowed to do so.

The committee's report on the subject of concrete poles contained a brief history of the work done by previous committees, gave the general theory of flexure of beams as applied to concrete poles, and developed the formulas by which the dimensions, the allowable loading, the most effective position of the reinforcing rods and like factors were computed.

As pointed out by the committee, a concrete pole is essentially a reinforced concrete beam. It is assumed that the pole is tapered both in section and reinforce-

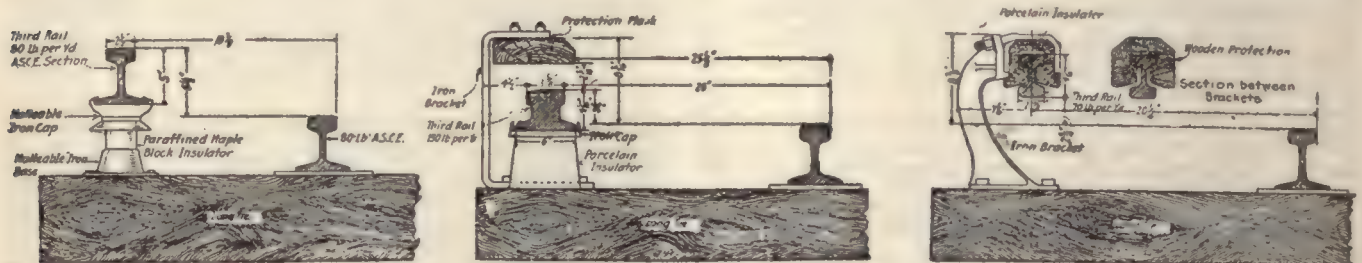


ment, and that the general theory applying to reinforced concrete beams also applies to these tapered beams. Detail calculations are given by which the equations for the position of the resultant compressive stress, the location of the neutral axis, the value of the resisting moments and the allowable loading of the pole are derived. Detailed drawings of a steel form for 30-ft. and 35-ft. concrete poles were given in an appendix.

The committee submitted specifications covering the following items of overhead line material: Intermediate castings for feed-in points; strain plates and bronze castings for trolley wire equipment, including plain and insulated crossings, ears, feed-in hangers, frogs and splicing sleeves. Under the heading of porcelain for voltages not exceeding 3000, specifications were submitted covering strain insulators and large and small feeder insulators. The other specifications recommended were for the following material: Seven-strand steel cable, switch boxes, tree and cable guards, wood insulator pins and brackets and wood-break strain insulators. In order to make the specifications clearer, drawings, made up into seven plates each  $3\frac{3}{8}$  in. x  $6\frac{3}{4}$  in., were included in the report. One of the accompany-

ing and the side contact types, of which typical installations are shown by the accompanying illustrations. The early installations were of the overrunning contact type, a gravity shoe being used. Later it became necessary to provide protection for the rail, and the gravity shoe was no longer practical owing to the fact that the entrance to the contact surface had to be made from the side. A slipper shoe, held in contact with the rail by means of a spring, has taken the place of the gravity shoe on protected third-rail systems. The protection of the overrunning third-rail consists in a plank about 6 in. wide which is supported above the rail by means of brackets bolted to the ties. The underrunning type can be protected both on the top and sides, and this construction has the added advantage in that the rail is self-cleaning in stormy weather. The side contact was used on a 1200-volt electrification in England, but it has many disadvantages.

The conductivity of the rail depends on the percentages of manganese and carbon. Commercial Bessemer rail, having from 0.4 to 0.5 per cent carbon and as high as 0.7 per cent manganese, was at first used, and the specific resistance was from ten to twelve times that of



TYPES OF THIRD-RAIL CONSTRUCTION, OVERRUNNING RAIL UNPROTECTED, OVERRUNNING RAIL PROTECTED AND UNDERRUNNING RAIL PROTECTED

ing illustrations is a half-size reproduction of one of these plates:

The committee stated that reports from member companies indicated that the majority find steel arms of higher first cost but cheaper in the end, as easy to obtain and install as wood, and requiring less maintenance. The committee recommended that the subject be broadened to include all metal arms and that specifications for the same be prepared. Certain minor changes, principally in the wording, were recommended in the general description of overhead line material and in the following specifications relating to 600-volt d.c. overhead trolley construction: Concrete settings, anchors in earth, anchors in rock, guy protection makers, trolley wire guy anchors, feeder supports, and lightning arrester grounds.

The committee did not consider it advisable to prepare a detailed specification covering third-rail construction. A general description of the development and the different types of third-rail construction was, however, submitted. It was pointed out that when electrification was extended to systems operating heavy cars at high speeds and over long distances, the overhead collector system as then used was not satisfactory. The adoption of the third-rail, however, solved the problem of providing a continuous conductor having a larger section than could be conveniently used overhead. This also allowed the use of a type of collecting device making the contact with the continuous conductor positive and not easily broken. The first practical use of the third-rail was in 1892, when patents were obtained in the United States by Charles H. McCloskey and Henry M. Brinkerhoff.

Third-rail construction were roughly classified by the committee as the overrunning, the underrunning

copper. The compositions, since developed; have had a lower percentage of carbon and manganese and a greater conductivity. This gives a softer rail, and it was pointed out that there are certain disadvantages in the handling and installation where a soft rail is used.

In regard to the location of the third-rail the committee included in its report a plate showing the standard limiting clearance lines for third-rail, permanent way structures and rolling stock. Although this standard has already been adopted by the American Electric Railway Association, attention was called to the fact that there were certain conditions not covered by these clearance lines.

A table was included in the committee's report giving the characteristic third-rail data of twenty-two railway companies, and a partial list of bibliographical references on third-rail construction.

A large amount of important data on high-voltage d.c. and catenary construction had been collected by the committee, and it was its opinion that the problems involved were no different from those of 600-volt construction, except as to insulation and minor mechanical changes. Past experience, it was said, seemed to prove that the simplest form of sliding hanger and single contact wire is best for the lighter service, with the question as to whether it or the duplex wire is best for heavy service still open. Two tables were submitted, one giving a partial list of high voltage d.c. railways with construction data and the other giving a partial list of catenary installations with fundamental data regarding each. It was recommended that the 1916-1917 committee be instructed to prepare specifications for catenary overhead trolley construction.

Having kept constantly in touch with the work of the



United States Bureau of Standards on the proposed national electrical code, the committee described briefly what had been done on the section on overhead and underground lines. In preparing this code, conferences were held with the representatives of light and power companies, electric railways, steam railways, telephone and telegraph companies, state industrial and public service commissions and the like, and the rules have been discussed from every angle. It was the bureau's suggestion that the code be adopted on trial for a period of one year, after which changes could be made. The committee emphasized the importance of studying the application of the code to existing conditions since after the year's trial state commissions might make the code mandatory. Instances were pointed out where the code differed from the standards of the association.

In completing the report the committee suggested the following subjects for reference to the succeeding committee: Additional specifications for overhead line material including high-voltage d.c. and catenary construction, continuation of the present committee on the subject of a standard thread for pins and insulators, and a further study of structural steel crossarms and fittings with a view to standardization. The report was signed by C. L. Cadle, chairman; E. J. Blair, E. J. Burdick, E. S. Gillette, C. R. Harte, M. J. Kehoe, C. R. Phenicie, R. H. Rice and C. F. Woods.

George W. Palmer, Jr., Bay State Street Railway, Boston, Mass., congratulated the association on the efficient and willing way in which the members of the power distribution committee had worked during the past year. He then referred to the thickness of lead sheaths for cables as recommended after the work of the 1915 committee. He noted that the present committee had decided to reduce the thickness of the lead sheaths in the larger sizes of cable, the reductions being about 10 per cent. He pointed out that on cables 2 in. in diameter and larger, the sheath had to withstand considerable rough usage, and he inquired on what experience the committee had based its recommendations for reducing the thickness of the lead sheath. He also inquired whether the A. I. E. E. had adopted the standard stranding rules to which the report referred. Mr. Cadle answered in the affirmative and also said that the proposed reduction in the thickness of lead sheaths was based upon the general experience of the committee members. For the larger cables the committee held the opinion that with the present standards the cables were too large, too expensive and too liable to breakage, therefore, the reductions in the thicknesses of the sheaths were favored.

Mr. Cadle also said that the definition given for the term "core" was that which best fitted the requirements of the committee. After general discussion the association approved as standard the specification for rubber-insulated wire and cable (Engineering Manual, D. S. 1 lb.), and the amendments to Sec. 17c and 22 and Tables I and VI shown on pages 6 and 7 of the report. President Lindall asked for the consideration of subject B and the recommendations of the standards committee, which were then given as follows:

G. W. Palmer, Jr., opened the discussion by asking whether the committee had taken up the matters relating to third-rail gage and elevation with the committee on heavy electric traction. He said that this committee had approved the American Institute of Electrical Engineers' rules on this subject. Chairman Cadle stated that this subject had been approved by the heavy electric traction committee, although no definite action had been obtained. H. H. Adams, Chicago Surface Lines, chairman of the standards committee, was also of the opinion that the other committees interested had approved this part of the report. In order

to clarify this matter President Lindall requested the secretary to check up the action of other committees and report any conflict to the executive committee for its consideration.

Subject C of the recommendations and standards committee was then submitted for approval.

A. S. Richey, Worcester (Mass.) Polytechnic Institute, opened the discussion by referring to the specifications for wood insulators and pins, and asked whether the dimensions recommended would conflict in any way with the work of the committee considering standard threads. C. R. Harte replied that the diameter of the pin and the length of threaded portion did not limit the work of the special committee which was to standardize the pitch and contour of the threads. He said the matter of standardizing threads was not new because practically standard threads are being used but they have not been clearly defined. Now whenever the question of fit between the insulators and pins arose, it was impossible to fix the blame because there was no standard thread contour and pitch.

Mr. Palmer inquired about the mix for bronze castings recommended in paragraph 58 of the report; the standard pin referred to in paragraph 69; the manner of bringing the cables out of the switch boxes in paragraph 74, and the hinged hasp and the manner of fastening the molding on the cable to make it secure, and the offset in the outer end-casting. In reply Chairman Cadle stated that the specification for the bronze mix was obtained from a number of manufacturers, and that the manner of bringing the cable out of a switch box was common practice where cables are brought from underground to overhead lines. Mr. Harte stated that the rib on the trolley ear did not take into account the cap-and-cone-type hanger because that type is becoming obsolete. Regarding the form of the end casting, he said that the committee simply adopted a manufacturers' standard. After some further discussion on the threading wood-insulator pins, a motion to defer action on this part of the specification was defeated and Subject C was approved. Brief consideration was then given to Subject D and the recommendation of the standards committee following which it was approved.

Chairman Cadle next called attention to the recommendation of the committee that the data on concrete poles be accepted for publication in the Manual. He asked whether this had the approval of the convention. In reply Mr. Richey stated that data in this form could not be found in any other place and that it was too important to be omitted. Mr. Adams called attention to the large size of the present Manual and said that it was a question whether matter of this kind should be included. He said that the standards committee was considering the question of including in the index references to all matter of this nature contained in the annual proceedings. At this point the motion to adopt the report as a whole was approved.

Chairman Cadle then submitted the report of the special committee considering the revision of the standard stranding table. The three recommendations of the committee, which were approved by the standards committee, were adopted without discussion. Chairman Adams then submitted the report of the standards committee and called particular attention to that part of it relating to the revision of the Manual. He also stated that the whole question of the standards was up for a very thorough review in order to determine why they were not being used more extensively. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., was of the opinion that the present form of the Manual made it difficult to use for reference purposes and suggested a different binding. A. E.



Harvey, Kansas City Railways, Kansas City, Mo., concurred in this and was of the opinion that the loose-leaf form with a different binding, perhaps the ring type, would put the Manual in more convenient form. In the discussion which followed it was the consensus of opinion that the loose-leaf form should be retained and that the binding should be changed to make the Manual open more easily. It was also believed the pages should all be of uniform size, including those containing standard sketches, and that thinner paper would reduce the size of the Manual. Finally, it was decided, upon motion, to refer the whole matter of revision of the Manual to the executive committee. This completed the program and the meeting adjourned.

#### ENGINEERING STANDARDS

Although the work of the committee on engineering standards forms a complete whole, it will be noted that the recommendations were considered in connection with the several other reports. An abstract of the standards committee report itself follows:

The report of the committee on standards included an outline of the proceedings during the past year and a report from the sub-committee on style which recommended minor modifications in the present form of specifications. The report of the sub-committee on revision of the Engineering Manual was also submitted in which it was recommended that the existing section devoted to miscellaneous methods and practices should be eliminated; that the Manual should be bound and printed for three years with yearly supplements; and that the present index be abolished and one similar to that found in technical periodicals be substituted. However, these recommendations were referred to the ensuing committee on standards for action.

The report contained a statement of the position of the committee on standards on a design for track construction submitted by the 1915 committee on way matters, on which no action had been taken by the 1915 convention. The committee on standards disapproved of the design, which provided for a 6-in. concrete slab underneath the stone ballast and ties, because conditions which would require such construction occur so seldom that the association is not warranted in adopting it.

The committee's action on current recommendations of the various standing committees was outlined in the report. The nature of this action has been published also as a part of each of the various standing-committee reports, which are abstracted elsewhere in this issue. The personnel of the standards committee is H. H. Adams, chairman; Martin Schreiber, vice-chairman; E. R. Hill, E. B. Katté, W. G. Gove, J. S. MacWhirter, C. F. Bedwell, J. W. Welsh, J. H. Hanna, C. H. Clark, R. C. Cram, C. L. Cadle and C. R. Harte.

On the revision of the recommended specification for overhead crossings of electric light and power lines, Mr. Cadle said that meetings had not been held because the national safety code covered similar ground. The committee thought it best to await final action on the code before proceeding with its work.

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### Tuesday Afternoon

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Just prior to the joint session of the Transportation and Engineering Associations, the latter held a joint session with the Accountants' Association and the report of that meeting is contained in the proceedings of the Accountants' Association.

#### BLOCK SIGNALS

The joint session of the Transportation and Engineering Associations was opened with the report of

the joint committee on block signals for electric railways. This was presented by J. M. Waldron, Interborough Rapid Transit Company, New York, and President Lindall presided.

The joint committee on block signals devoted the first part of its report to a review of existing standards and recommendations that had originated with it in previous years. Among other things it was recommended that the present standard covering the use of continuous track circuits for the control of automatic signals for high-speed interurban service should be removed from the Engineering Manual, the most important reason being that, as worded, this standard is misleading and does not give the proper information. In its place, requisites for automatic block-signal installations on high-speed interurban railways, as adopted by both the American Railway Association and the Railway Signal Association, were recommended as a standard.

The report contained also a digest of block-signal laws, giving references to the work on this subject that has been heretofore accomplished by the committee. From abstracts of the replies to an inquiry directed by the committee to the various commissions in the country, it was evident that there had been no legislation of importance enacted during the current year.

With regard to the subject of design of block-signal apparatus, the committee submitted a design for block-number figures arranged horizontally on a plate attached to the signal mast. The committee also submitted drawings showing foundations for switch indicators, and for signal masts with top-post and bottom-post mechanisms. Two standard clearance diagrams for semaphore signals were proposed for adoption as standard. One of these is designed to cover all cases where steam railroad equipment is operated over electric lines and trainmen are allowed to climb up the side of or ride on top of cars, while the other covers the case where permission is given to trainmen to ride upon the tops of cars.

Progress was reported in connection with the subject of block signal rules, a special committee having been appointed to confer with the American Railway Association to the end that joint consideration might be given to this subject, although up to the present time no opportunity has been afforded for mutual action.

Considerable space was devoted in the report to highway crossing protection, a large amount of data having been collected during the past year. The committee recommended, however, that the study of the entire problem, especially as regards the adoption of a standard aspect for highway crossing signals, should be continued by the incoming committee. The committee also proposed a list of desirable features which should be embodied in all types of crossing signals and suggested that with further study the list might be adopted by the association as a series of requisites for such installations.

With regard to light signals for interurban railways, the report stated that no radical changes had been made since the report of last year's committee except that a new type of lamp had been developed which made unnecessary the use of two lamps behind each lens. This new lamp is made with a semi-concentrated double filament in which one section has a higher resistance than the other and hence tends to burn longer, thus minimizing likelihood of both sections burning out at the same time. With regard to the size of lens the report stated that these now range from 5⅜ in. to 10⅜ in. in diameter and that, since the Railway Signal Association was considering the subject, the adoption of a definite lens size should be postponed pending further investigation.

In the report was included, also, a description of a series of tests which can be applied generally to trolley-contact signals to determine the reliability of design.



In this connection the committee stated that in all types of contactor signals the signals should have a definite indication showing that the block is unoccupied. This indication should be so arranged that on failure of power or dearrangement of the signals, no indication will be given. Signals should be so designed that as a car passes under the contactor when entering a block, the signal at the opposite end will display a danger indication and the signal at the entering end will show proceed.

The committee stated also that it had tried to further the standardization of aspects for trolley contact signals and to advocate those which would be easy of interpretation and incapable of being mistaken, and to this end certain aspects for contactor signals were recommended in the hope that the different manufacturers would lend their efforts toward standardization. The committee considered that the aspects which had been recommended for use in the past were the best that could be made practical in view of the development which the contactor-signal art had reached at that time. However, a means

the committee stated that, during the year, it had continued its investigation of the subject and had found but little change to have taken place in operating methods. No appreciable extension of this method of operation had taken place, and the committee was without necessary information based on actual practice to make definite recommendations concerning the matter. Therefore the committee set forth its position as given in last year's report.

As appendices to the report there was a bibliography on block signals; a summary of some recent signal installations; a tabulation of replies to a data sheet giving the cost of maintenance of signal systems, their operating records and the schemes of organization of the signal department, and a review of the work of previous committees. The report was signed by J. M. Waldron, chairman; J. W. Brown, vice-chairman; J. B. Stewart, Jr., John Leisenring, G. N. Brown, J. J. Doyle, F. W. Coen and G. K. Jeffries.

In considering the above report separate attention was given to the clearance diagrams which were presented at the 1915 convention but were referred back for joint action. Upon motion these diagrams were adopted as standard and the remainder of the report was accepted as information.

#### TRANSPORTATION-ENGINEERING

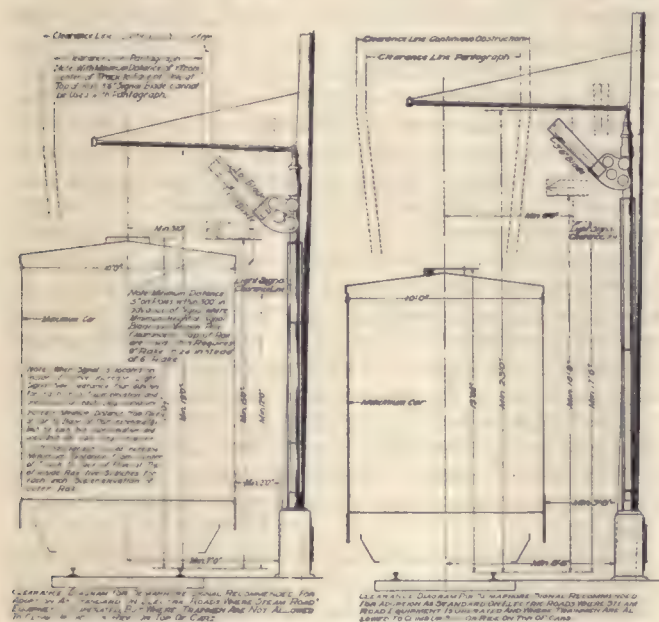
The subject of one-man car operation was taken up at considerable length by the committee on transportation-engineering. The report consisted of a summary of replies from 101 companies to a request for data on one-man cars, together with the committee's comments. From these there appeared to be a general agreement that one-man cars are not suitable for operation where traffic congestion is great and where considerable loading and unloading of cars takes place. There is a saving in platform costs, but this may be offset to some extent by decreased schedule speed. It is probable also that the one-man car has an effect upon the riding habit, but no data on this subject could be obtained.

With regard to the cost of operation of one-man cars, a saving was reported by seven companies and in four other cases the saving was not offset by any disadvantages. Two companies stated that the reduction in cost had made it possible to operate in districts where this was otherwise impossible. In general, a favorable attitude was reported on the part of the public, but in some cases public service commissions were opposed to one-man car operation. In general, franchise stipulations were not restrictive.

No serious difficulties of operation appear. At grade crossings seven companies report the employment of flagmen and nineteen companies report flagging the crossing by the motorman. Two report the use of a derail device operated by the motorman, and thirteen require the car to make a stop before going over the crossing. With regard to the trolley operation, retrievers and trolley guards over railroad crossings are suggested as advisable. With regard to fare collection, it is generally agreed that some type of fare box should be employed. Fifty-three companies report the issuance and collection of transfers in the usual way, while fifteen companies report that no transfers are used.

According to the data submitted in sixteen of the replies, the average length of car is 30 ft., the maximum being 40 ft. and the minimum 21 ft. The average weight is 22,300 lb. as reported by nine companies; the maximum being 30,000 lb. and the minimum 11,000 lb. The average seating capacity as reported by twenty-two companies is thirty-five, the maximum being fifty-two and the minimum twenty-four.

In general, it appears that one-man cars reduce boarding and alighting accidents, although there is a



CLEARANCE DIAGRAMS FOR SEMAPHORE SIGNALS

had now been suggested whereby it might be possible to use the standard high-speed signal aspects for contactor signals. [This scheme was described in detail in the *ELECTRIC RAILWAY JOURNAL* of Sept. 30, 1916.] Since the desirability of such aspects was obvious, the report included an outline of the scheme in order to ascertain the feeling of the members of the association as to its practicability. Apparently it is possible with these aspects to get full flexibility of operation and to cover all special movements as well as they can be covered with the present aspects.

The report included, also, a summary of the work of the various joint committees on block signals from the year 1910 to the year 1915, giving in outline the recommendations of past committees and a brief abstract of the contents of each year's report. With regard to methods of drawbridge protection the committee submitted a set of requirements for the protection of traffic on movable bridges, together with a recommendation that they be adopted as a standard practice and included in the Engineering Manual. In addition the committee displayed a number of sketches to show the various methods of protecting drawbridges for the information of the member companies. With regard to the operation of single-track lines by block signals only,



question whether the reduction has been due to the new method of operation or to the use of inclosed platforms which are frequently used with one-man cars. Separate entrance and exit passageways are believed by the committee to be preferable, together with power operation for doors and steps. Nothing definite appears in regard to seating arrangement, nor with regard to the necessity for an emergency exit at the rear. Manual operation for brakes appears in the majority of cases, but the committee recommends power brakes, particularly where high schedule speed is necessary.

The report was signed by W. A. Carson and F. R. Phillips, co-chairmen; C. F. Hewitt, P. N. Jones, W. J. Harvie and J. W. Allen.

J. M. Bosenbury, Illinois Traction System, Peoria, Ill., opened the discussion. He said that when one-man operation was first considered by his company the question of converting old cars or buying specially designed new cars was raised. After a careful analysis it was decided to purchase new cars. This was done in 1912 and since that time much lighter cars have been built. Regarding the safety features he said that they had been included to counteract the criticism of city officials. By the change from two-man to one-man operation it had been possible to increase the service from 25 per cent to 40 per cent and at the same time show a saving of from 25 per cent to 30 per cent in platform and current consumption costs. The light-weight cars also permitted extensions to the service because cheaper track could be built and thus reduce the fixed charges.

Furthermore the small cars tended to reduce track maintenance costs by reason of their light weight, and the reduction in energy consumption affected overhead lines and power house requirements.

On the various properties where one-man car service had been inaugurated and the service increased thereby, the public was favorable to their operation. Mr. Bosenbury was also of the opinion that when this type of car had demonstrated its safety in operation regulating bodies would have no objection to its use. In no case did the Illinois Traction System disregard franchise stipulations in inaugurating one-man car service. In one instance, however, it was necessary to obtain special permission to operate them under an existing franchise. When they were first introduced the scheduled speed was reduced somewhat but as soon as the public became familiar with their operation this condition did not hold. He said that his company had not encountered any particular difficulty in issuing transfers or making change. Mr. Bosenbury was also of the opinion that longitudinal seats should be used in double-end one-man cars and cross seats in single-end cars of this type. In order to simplify the duties of the motorman air brakes are a necessary part of the equipment and air-operated doors and steps may readily be included in the air-brake system. As a matter of fact his experience had demonstrated that air-operated doors and steps were safer.

Chief Engineer Larson of the Wisconsin Railroad Commission said that the members of that commission were favorably disposed toward one-man cars where conditions warranted their use. The commission asked, however, that their operation at railroad crossings be safeguarded and that their design be made safe for passengers. Mr. Phillips then closed the discussion with the statement that a decrease in operating costs could also be obtained by reducing the weight of two-man cars. This would, no doubt, make the savings by one-man operation less attractive. He was also of the opinion that one-man cars tended to slow up the schedules and thus increase the cost of operation. This completed the program and the meeting was adjourned.

## Wednesday's Session

The first business on Wednesday afternoon was the presentation of the report of the committee on power generation by J. W. Welsh, Pittsburgh Railways, chairman.

### POWER GENERATION

The report of the committee on power generation comprised the results of a study of certain sections of the A. I. E. E. standardization rules, a comparison of the different types of rotary converters, together with the accompanying transformers, a tabulation of data on power-house operation, including costs, and a recommendation of approval of the A. S. M. E. boiler code as a standard.

Regarding the A. I. E. E. standardization rules, the committee pointed out a number of significant facts and made several recommendations for consideration by the institute. Attention was called particularly to the following points: The rating of motors is expressed in kilowatts at the shaft instead of horsepower; and a single rating, preferably the continuous rating, is made the standard for electrical machinery, but no provision is made for overload ratings except in the case of nominal ratings for railway motors and railway substation machinery. The standard ambient temperature of reference for air is 40 deg. C. instead of 25 deg. C. and no correction is made in the temperature rise in case of other ambient temperatures. An increased rating is permitted on water-cooled transformers for the same ultimate temperature by fixing the temperature of entering water at 25 deg. C. The thermal limit of electrical machinery is put on the basis of ultimate temperature and not temperature rise and these ultimate temperatures are respectively 95 deg. C., 105 deg. C. and 125 deg. C. for the several classes of insulating materials with specified corrections based on the method of measurement.

The committee recommended for consideration by the A. I. E. E. the following: That the limitations of noise and vibration be added under "Objects of Standardization" of electrical machinery. That the correction for change in resistance in air-blast transformers for entering air at temperature other than 40 deg. C. should apply to other machinery when the ambient temperature is other than 40 deg. C. That the momentary commutation limit on continuously rated machines be not less than 200 per cent of the continuous rating in amperes instead of 150 per cent. That the term "auxiliary pole" be added to the name plate information of machines when this type of construction is used. That the range in the setting of circuit breakers be specified in per cent below and above rating. That, in the tests of performance of lightning arresters, the minimum voltage at which they discharge be fixed in terms of a minimum and maximum percentage range of the normal voltage of the circuit they protect. That the limits of successful commutation be specified in connection with the nominal rating of substation machinery. A load of 300 per cent should be successfully commutated and carried for one minute without disqualifying the machine for continued service.

In comparing the advantages and disadvantages of 60-cycle apparatus with particular reference to commutating-pole rotary converters, the committee gave tables of data of 600-volt, six-phase railway synchronous converters, and rotary converter transformers of 1915 and 1913 of the single-phase 11,000-volt class, with 15 per cent re-



actance. The following salient facts regarding converters were given: (1) The speed of the commutating-pole machine ranges from 33 per cent in the case of 60-cycle machines to 100 per cent in the case of 25-cycle machines higher than the non-commutating pole type. (2) The peripheral speed of the armature is approximately the same in both types. (3) The peripheral speed of the commutator is approximately the same as both types. (4) The floor space occupied by the commutating-pole type is approximately two-thirds of that required by the non-commutating-pole type. (5) The efficiencies of the two types are approximately the same but slightly in favor of the commutating-pole type. (6) The most noticeable gain is in the weights of these two types, the commutating-pole type weighing roughly only one-half as much as the non-commutating-pole type. (7) The price per kilowatt of the commutating-pole type ranges from 75 per cent in the 60-cycle machines to 50 per cent in the 25-cycle machines of that of the non-commutating-pole type.

On the subject of rotary converter transformers the committee states that the use of silicon iron has permitted higher flux densities without increased losses. Better means for conducting away the heat from transformer coils and core have been provided, and the standard rated capacity in transformers supplied to a given rated capacity in rotary converters has been reduced. The following deductions from the data tabulated are made: (1) The rated capacity of the 1915 transformers is approximately 10 per cent less than the 1913 transformers for use with the same rotary equipment. (2) The weight of the 1915 transformers is approximately 20 per cent less than the 1913 transformers of the same rating and frequency. (3) The floor space of the 1915 transformers is approximately three-fourths that of the corresponding 1913 transformers. (4) The efficiencies of the two types of transformers are approximately the same. (5) The price per kilowatt of the two types of transformers is approximately the same, but slightly in favor of the 1915 transformers.

A large part of the committee's report is occupied with power plant data in which total costs per kilowatt-hour, fuel costs per kilowatt-hour and labor costs per kilowatt-hour are given, as well as the following fundamental data: Net output from busbars in kilowatt-hours; maximum one-hour peak in kilowatts; load factor (one hour to average kilowatt-hours); capacity for two-hour peak in kilowatts; plant factor (average hour to two-hour capacity); pounds of coal per month; pounds of coal per kilowatt-hour; B.t.u. as received; B.t.u. per kilowatt-hour; cost of building; cost of maintenance; cost of employees' labor; cost of fuel for power; cost of water for steam; cost of lubricants, and cost of miscellaneous supplies. While the committee points out that this tabulation is incomplete, it is believed that the tables will be useful as indicating actual performances under various conditions of load factor, fuel costs, and types of equipment.

The above report was signed by J. W. Welsh, chairman; H. G. Stott, G. H. Kelsay, F. S. Freeman, A. B. Stitzer, G. T. Bromley, W. E. Rolston, L. E. Sinclair and J. G. Swain.

In the discussion L. P. Crecelius, Cleveland Railway, referring to the numerous factors entering into the design of rotary converters which have been largely responsible for putting this type of apparatus on an entirely new basis as regards a frequency of 60 cycles said substantially as follows:

Only a few years ago the requirement of 600-volt d.c. power from transmission circuits operated at 60 cycles made a combination for which rotary converters were poorly suited. Their use for railway purposes at least

was to be avoided under the circumstances. This situation does not hold to-day and in fact it is now not only possible to make use of rotary converters for this purpose, but the higher frequency has several decided advantages, namely, standardization of frequency, low cost and high economy.

Sixty-cycle substation apparatus is considerably less costly than smaller apparatus designed for 25 cycles. Although the committee's report indicates an advantage in efficiency in favor of 25-cycle converters, on the other hand the 60-cycle transformers are somewhat more efficient. Consequently the respective combinations of converters and transformers are about on a par in this respect. In fact, 17,000 kw. of 60-cycle rotary converter equipments have been in continuous operation in Cleveland since January, 1913. Their operation has been entirely satisfactory and the efficiency is very high. The combined conversion loss is but 8.64 per cent of all the power delivered to the alternating current bus bars at the substations.

Mr. Crecelius stated that in studying the data of operation and the costs of railway power stations given in the report he had prepared a summary grouping the data according to the character of the plant and using

OPERATING DATA, VIADUCT POWER PLANT, CLEVELAND RAILWAY,  
ONE YEAR'S OPERATION, D. C. CROSS-COMPOUND  
CONDENSING ENGINES

1. Output from bus, kilowatt hours.....	44,988,468	
2. Maximum one-hour peak, kilowatt-hours....	11,050	
3. Load factor: one hour to average kilowatt-hours, per cent.....	46.5	
4. Capacity for two-hour peak kilowatt.....	11,000	
5. Plant factor average kilowatt-hours to two-hour cap. ....	467	
6. Tons coal (2000 lb.).....	87,609	
7. Pounds coal per kilowatt-hour.....	3.9	
8. B.t.u. as received .....	12,530	
9. B.t.u. per kilowatt-hour.....	48,801	
10. Account No. 45, management and care.....	\$4,331.53	\$0.0096
11. Account No. 46, buildings.....	980.67	.0022
12. Account No. 47, maintenance.....	22,653.90	.0504
13. Account No. 48, management and care.....	\$4,331.53	0.0096
14. Account No. 53, fuel for power.....	143,632.32	.3195
15. Account No. 54, water for steam.....	8,057.83	.0179
16. Account No. 55, lubricants.....	6,386.47	.0142
17. Account No. 56, miscellaneous supplies.....	3,657.14	.0081
18. Total above accounts .....	\$240,679.83	
19. Total cost per kilowatt-hour, cents.....		0.5356

percentage of total expense opposite the several accounts instead of dollars and cents. This table is reproduced herewith.

The summary includes the performance of a cross-compound condensing engine driven 600-volt d.c. generating plant, also shown in an accompanying table. He said at this point that it would be interesting to examine further into the expense of operating the two types of power plant represented, with a view to bringing out the influence of overhead expense upon the cost of operating them, giving also consideration to high tension distribution and conversion losses.

An analysis along this line showed that, all things considered, there is less than 5 per cent difference in expense between the operation of the best modern turbine plant as presented by the committee and that of an old direct-current engine plant. Nevertheless, the latter familiar type of railway power plant is fast disappearing. There are numerous important causes other than cost of operation which are at work. Most of the remaining power plants of this character were built fifteen to eighteen years ago and were located without regard to suitable water facilities.

It was of prime importance to locate these plants more with regard to accommodating the low-tension distribution system because of the severe restriction imposed by the 600-volt requirement. The range of mechanical usefulness of this type of plant in this regard was limited to a radius of less than 15,000 ft., in conse-



ARRANGEMENT FOR COMPARISON OF POWER PLANT OPERATING AND COST DATA ACCORDING TO CHARACTER OF EQUIPMENT. (CRECELIOUS)

Plant	Modern Turbines					Engines			
	A	B	C	D	Average	E	F	G	Average
Net output from bus, kw.-hr.	130,076,945	111,082,725	91,402,690	172,927,100	126,372,365	41,304,359	43,314,700	44,988,468	48,202,509
Maximum one-hour peak, kw.-hr.	42,000	33,240	23,000	46,100	38,085	13,900	8,500	11,050	11,150
Load factor, one hour to average kilowatt-hour	0.35	0.38	0.453	0.428	0.403	0.339	0.58	0.465	0.461
Pounds of coal per kw.-hr.	1.75	1.97	2.78	2.48	2.245	2.58	4.19	3.90	3.56
B.t.u. as received	14,459	14,250	13,000	13,300	13,752	14,165	13,100	12,530	13,265
B.t.u. per kilowatt-hour	25,300	28,100	36,200	33,232	30,708	36,400	54,889	48,801	46,697
Management and care: (All quantities below in per cent)									
Buildings	0.41	0.27	0.14	0.99	0.45	0.28	0.57	0.41	0.42
Maintenance	3.91	7.25	7.55	11.30	7.50	8.81	8.96	9.59	9.12
Wages	8.81	7.25	15.61	17.60	12.32	16.10	20.30	21.57	19.32
Fuel for power	84.58	83.84	72.48	64.30	76.30	66.50	55.40	60.77	60.89
Water for steam	0.78	...	0.00	0.62	0.47	5.60	11.37	3.41	6.79
Lubricants	0.17	0.61	0.79	1.10	0.67	1.14	1.54	2.70	1.79
Miscellaneous supplies	1.34	0.78	3.43	4.07	2.41	1.57	1.82	1.55	1.67
Total of above accounts	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

quence of which it was impossible to serve the average railway system from a single plant. The capacity of such plants was therefore confined to about 1200 kw. and the numerous plant sites thus created have now become immensely valuable as real estate but entirely too expensive to keep.

The addition of low-pressure turbines coupled to direct-current generators may in a few cases prolong somewhat the effective life of such plants, but taken on the whole the continued extension and growth of electric railway systems has outdistanced this type of plant because of its inflexibility. Thus at its best this old familiar power house must go, for it does not fit into the larger scheme of things.

After Mr. Crecelius' paper was read, C. L. Cadle, New York State Railways, Rochester, N. Y., suggested the importance of having some standard basis for load factor. Mr. Crecelius thought that this matter is already fairly well standardized, but, in any event, it will be brought up for consideration by the national joint committee on standardization of methods for determining cost of power. The representatives of the Engineering Association on this committee are Mr. Crecelius, Mr. Welsh and E. H. Scofield, Twin City Rapid Transit Company, Minneapolis, Minn. Continuing the subject of load factor, W. G. Carlton, New York Central Railroad, New York, N. Y., said that in determining load factor the 1-hr. peak as used by the committee is hardly fair, as far as boiler costs are concerned. A 15-min. peak would be better, as boilers can carry a peak for this period.

M. V. Ayers, Interstate Commerce Commission, Washington, D. C., suggested that to the statement of the committee to the effect that the price per kilowatt of the 1913 and 1915 transformers is but very slightly in favor of the latter there should be added that the later rotary converters are cheaper.

After Mr. Welsh had explained that the committee did not consider it wise to publish further the tables of power plant operating cost data, the report of the committee was accepted with thanks.

## WAY MATTERS

The report of the committee on way matters containing 100 pages was confined largely to three sets of specifications, namely, those for all classes of special work, for several types of pavements, for preservatives and the treatment of woods and a review, with recommendations regarding ballast for suburban and inter-urban lines. In connection with the special work specifications the committee made a complete revision of this subject, particularly with respect to form, and also prepared specifications for plain bolted special work. In revising these specifications it was decided that the great variety of materials entering the manufacture of the various classes made it advisable to prepare a separate set of specifications for materials. In preparing these specifications the way committee had the counsel of a committee of special work manufacturers. In connection with the specifications for manganese steel special work, the manufacturers objected to the size of the test piece and the time of its heat treatment as provided in the 1915 specification. After consideration their criticisms were accepted and the specification changed. In addition this specification was amended to limit the wind or warp in the bearing surfaces of solid manganese steel pieces, and extraordinary care in this particular was recommended where the special work was to be laid on steel instead of wooden ties. These specifications as revised and enlarged were submitted as recommended specifications by the way committee and approved by the committee on standards.

## REVISED SWITCH AND MATE DIMENSIONS

Under the subject of recommended design of layouts for switches, mates and frogs, the committee paid particular heed to the lengths of switches and mates as contained in the Engineering Manual. It found that in practice the modern rail sections, when made into switch pieces of the standard lengths, did not permit adequate opening at the heel for setting the joint plates and tightening the bolts. In order to obviate these difficulties the committee revised the table of lengths,

TABLE I—DIMENSIONS OF SWITCHES AND MATES

Standard Radius	Radius for All Gages	DIMENSIONS							
		A		B and C		D		E and F	
		Suggested	Present	Suggested	Present	Suggested	Present	Suggested	Present
50 deg. Lat.	47 ft. 7½ in.	-6 in.	-6 in.	10 ft. 0 in.	10 ft. 0 in.	-6 in.	-6 in.	10 ft. 0 in.	10 ft. 0 in.
75 deg. Lat.	72 ft. 7½ in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.
100 deg. Lat.	97 ft. 7½ in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.
150 deg. Lat.	147 ft. 7½ in.	12 in.	12 in.	15 ft. 0 in.	14 ft. 0 in.	12 in.	12 in.	15 ft. 0 in.	14 ft. 0 in.
200 deg. Lat.	197 ft. 7½ in.	18 in.	18 in.	16 ft. 6 in.	15 ft. 0 in.	18 in.	18 in.	16 ft. 6 in.	15 ft. 0 in.
100 deg. Wye.	97 ft. 7½ in.	-6 in.	-6 in.	10 ft. 0 in.	10 ft. 0 in.	-6 in.	6 in.	10 ft. 0 in.	10 ft. 0 in.
150 deg. Wye.	147 ft. 7½ in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.
200 deg. Wye.	197 ft. 7½ in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.
350 deg. Wye.	347 ft. 7½ in.	12 in.	12 in.	16 ft. 6 in.	15 ft. 0 in.	12 in.	12 in.	16 ft. 6 in.	15 ft. 0 in.

NOTE.—It is recommended that the 100 foot radius Lateral and 200 foot radius Wye shall be used wherever practicable. It will rarely be found necessary to use others.



which was unanimously approved by the committee of special work manufacturers. The diagram and the revised dimensions of switches and mates are shown in the table at the bottom of page 830.

The committee also called attention to the desirability of standardizing special work layouts with a view of minimizing the number of frogs having different angles. It suggested that the initial step toward accomplishing this result would be to adopt a standard spiral. Special work manufacturers were in sympathy with this recommendation, and indicated that they would be glad to accept a spiral adopted by the association. The dimensions of switches and mates were approved as recommended design by the standards committee.

#### BALLAST FOR OPEN TRACK

Ballast for suburban and interurban lines was also considered in this report, and the following conclusions were drawn and approved by the standards committee:

1. The best ballast is crushed stone or washed gravel ranging in size from  $\frac{3}{4}$  in. to  $2\frac{1}{2}$  in.
2. Crushed stone or washed gravel ballast should not be less than 8 in. deep under the ties for main-line tracks.
3. Bank-run gravel ballast should not be less than 12 in. deep under the ties for main-line tracks.
4. Cinder ballast should not be less than 12 in. deep under the ties for main-line tracks.
5. Any increase in the minimum depths of ballast stated in conclusions 2 to 4 inclusive should decrease the cost of track maintenance.
6. The greater the depth of ballast the better the drainage, which increases the life of ties, decreases maintenance, maintains better general track conditions, and decreases rolling-stock maintenance.
7. Drainage is of primary importance to maintain a stable subgrade.
8. The ballast section should be so formed as to provide surface drainage.

#### PAVEMENT SPECIFICATIONS

Pavement for use in connection with girder grooved and plain girder rail (T-rail) received thorough consideration and recommended specifications were prepared for brick pavement, granite block pavement and creosoted wood block pavement, and foundations for these pavements, together with specifications for cement grout filler, asphalt filler, gas-tar pitch filler and coal-tar mastic filler. These specifications were mainly adapted from those of the American Society of Municipal Improvements and the American Wood Preservers' Association. These specifications were submitted as information with the request that they be studied carefully in detail with a view of bringing out suggestions for their improvement. A continuation of the subject was recommended with a view to embodying such criticisms and suggestions in the specifications before they are finally submitted as recommended standard.

#### SPECIFICATIONS FOR PRESERVATIVES AND TREATMENT OF WOOD

Acting upon its instructions, the way committee submitted specifications for preservatives and the treatment of wood for inclusion in the Engineering Manual, taken largely from the standards of the American Railway Engineering Association, the National Electric Light Association and the American Wood Preservers' Association. The committee deemed this the wise course, because the specifications adopted by these associations have now been in general use for a number of years without requiring important revision. In adapting these specifications for electric railways, however,

the committee recommended a number of modifications, the principal one of which was a simplified and readily obtainable apparatus for analyzing preservatives. This report, after discussing the fundamental principles and the advantages of timber preservation, sets forth ten general requirements, largely taken from the manual of the American Railway Engineering Association, and information regarding the importance of grouping timber and preparing it for treatment. The modified specifications submitted for adoption as recommended specifications include those for Nos. 1, 2 and 3 grades of creosote oil used as standard by the American Railway Engineering Association; a specification for creosote coal-tar solution, which is also a standard of the American Railway Engineering Association; a specification for the fractionation of creosote oil, one for tie treatment and treatment by the Bethell process. Specifications were also prepared for brush, dipping and open-tank treatments, including a specification for the creosote oil to be used when treatment is by these processes. This subject was referred back for further consideration of other materials and for joint action by other interested committees. A form was submitted for the purpose of gathering service records of ties and other timber, in order to put it before the electric railway industry.

In view of the large amount of work necessary to prepare these specifications, the committee did not have time to take up a number of other important subjects assigned to it. In commenting upon this fact, as well as the work of past committees, it expressed itself as dissatisfied with the conditions under which committee work has been conducted, and suggested a careful review of the methods in order to bring about an arrangement whereby the work can be continued from year to year and the appointments of committee members made more promptly than in the past. Attention was also called to the growing importance of the subject of curved heads for girder rails and the fact that a number of member companies have installed test sections of track with rails of this type. In order to put this matter before the association, the way committee recommended that this subject receive prompt consideration by the ensuing committee acting jointly with the committee on equipment.

In the discussion on the above report A. E. Harvey, Kansas City Railways, pointed out how useful these specifications will be in loose-leaf form for sending out to bidders on materials. He explained how some of the paving specifications had been made up. For example, those on granite blocks were based on the "Chicago specifications," while the brick specifications followed those of the American Brick Manufacturers' Association.

At this point A. C. Simmons, a former president of the association and now Commissioner of Public Works, Milwaukee, Wis., was invited to say a few words. He said that during the past five years he had found himself in a position to understand both sides of the problem of the relation of railways to municipalities. In Milwaukee the situation is complicated by the fact that many technical questions are being settled in the courts. Referring to Mr. Simmons' remarks, G. W. Palmer, Bay State Street Railway, Boston, pointed out that in serving corporations engineers should remember that they are public servants as well as corporation servants.

E. M. Haas, *ELECTRIC RAILWAY JOURNAL*, devoted his remarks to wood preservation. He stated that the committee had in its work the co-operation of the United States Forest Products Laboratory and other expert assistance. The committee had not included in its report the zinc-chloride treatment of ties, because this appears



not to be considered well adapted for electric railway tie preservation. Water-gas-tar specifications were not included, although such tar is used in connection with coal-tar creosote.

In response to an inquiry concerning the effect of preservatives on the electrical resistance of ties, Mr. Haas quoted from "Preservation of Structural Timber," by H. F. Weiss, director Forest Products Laboratory, the following statements:

"1. The resistance of timber varies directly with the length and inversely with the cross-section.

"2. The resistance of timber varies almost inversely with the amount of moisture present, between the limits of 15 and 50 per cent.

"3. The resistance of timber is lowest when measured along the grain and highest when measured tangentially to the growth rings.

"4. When treated with a soluble salt, such as zinc chloride, the resistance varies approximately inversely as the amount of the salt present.

"8. Treatment of timber by different creosote processes does not greatly change the natural resistance of the timber.

"A number of traction companies state that the zinc-treated ties corrode their spikes very rapidly, and for this reason they are opposed to using them. It is entirely possible that this will occur, especially if the ties are liable to hold much moisture and are situated a long distance from the power house. Ties which can be kept fairly dry and can be laid close to the power house so that the return current will be through them, rather than away from them, should give little trouble."

At this point E. M. T. Ryder, Third Avenue Railway, New York, called attention to the importance of service data on the use of the various types of pavement included in the specifications. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., asked for information concerning the use of water-gas-tar-creosote. He also called attention to the effect of zinc-chloride-treated ties on signal operation as experienced by steam railroads. He referred to the use of cinder ballast, and said that it was not always injurious to ties. He said that there was a section of track on his road where cinder ballast had been used exclusively for a number of years, and he had never been able to find a case in which a tie appeared to be affected by the cinders.

Martin Schreiber, Public Service Railway, Newark, N. J., stated that he was in full accord with the action of the standards committee in referring the subject of wood preservation back to the committee for further consideration. He believed that a specification should also be included to cover water-gas-tar creosote. Such a specification had been prepared by the National Electric Light Association, and he had been purchasing oil under it for a number of years. Up to the present time, he said, he had been unable to discover that the results being obtained were any different from those where coal-tar creosote had been employed. He was of the opinion that the subject was too important to pass over hastily, and he then told of the tremendous amount of work necessary in preparing wood-preservation specifications for the National Electric Light Association. The discussion also brought out the fact that cinder ballast was being generally used by the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, without deleterious effect on the ties.

H. M. Steward, Boston Elevated Railway, Boston, Mass., said that his company had recently installed a wood-preserving plant and had found that he could make a saving over having the treatment done in commercial plants. A. B. Skelding, Tidewater Power Com-

pany, Wilmington, N. C., said that his company was also treating its own ties with Maintenance of Way specification creosote. Very satisfactory results were obtained by the open-tank process, in which a hot and cold bath is employed. Short-leaf pine ties, which only lasted a few years in his part of the country, were in a perfect state of preservation eight years after treatment.

George L. Wilson, Twin City Rapid Transit Company, Minneapolis, Minn., stated that his company had recently purchased 20,000 ties treated by the Card process. After three or four years the spikes were found to be badly corroded. These ties were used in track in paved streets and undoubtedly the presence of moisture and the  $\frac{1}{2}$  lb. of zinc chloride per cubic foot were responsible for the rapid rate of corrosion. He then referred to the paving specifications, and recommended that granite block be used exclusively for track in paved streets. While it was somewhat higher in first cost than other types, it gave a much longer life. Undoubtedly the objection of the public to this type of pavement was based on its experience with the old form of granite block used. Under the specifications included in this report granite block may be purchased and, if carefully laid, will produce a most satisfactory pavement.

Mr. Wilson also recommended that the blocks be inspected at the quarries rather than at the point of delivery. He had found that the quarrymen did not object to rigid specifications as long as the blocks were inspected when they were in the hands of the cutters. When the blocks are inspected at the point of delivery the quarrymen have no way of fixing the blame for imperfect workmanship. He said that granite-block pavement was purchased for Chicago in this manner, and the inspectors picked out the culls, placing those which could be recut in one pile and those which could not in another. Mr. Wilson also recommended a grout filler for granite-block pavements.

Mr. Steward then described a method he had recently adopted which made it possible to use old blocks or seconds in laying granite-block pavement. This process included extreme care in laying the blocks with open joints, filling the bottom of the joint with clean pea-gravel and filling them with 1:1 grout. Just before the grout has taken the initial set it is scraped from the surface of the blocks with a hoe, with the blade bent to 45 deg. with the handle. Following this operation, the pavement is swept with a push-broom, with the broom fixed at 45 deg. with the handle. After this had been done the surfaces of the blocks were thoroughly cleaned with a whitewash brush and water.

R. D. Hood, Massachusetts Northeast Street Railway, Haverhill, Mass., said that he had employed this method of laying granite-block pavement and obtained very satisfactory results. Although he had used many blocks which were seconds or culls, the finished pavement showed no depressions and it was dustless. If this process of grouting the pavement is employed, old blocks are just as satisfactory as new ones. He also called attention to the fact that the granite-block specifications in the report did not provide for the use of pea-gravel in the bottom of the joints. He was of the opinion that this was important, because it saved a certain amount of grout filler and the gravel increased the mechanical strength of the joint. As a matter of fact, in removing some pavement which had been grouted in this manner he found many instances where blocks broke instead of the grout filler.

E. A. West, Denver Tramway Company, Denver, Col., and D. P. Falconer, New York State Railways, Rochester, N. Y., described types of concrete pavement which they had employed with satisfactory results. Mr. West



used a 1:4:8 mix below the ties, a 1:3:6 mix for the pavement foundation and a 1:2:3 mix for the pavement wearing surface. Mr. Falconer's experience with concrete pavement had been in making temporary repairs where he desired a pavement that would last as long as the old rail. He was of the opinion that concrete pavements would not last for periods longer than seven or eight years.

R. C. Cram, Brooklyn Rapid Transit Company, Brooklyn, N. Y., closed the discussion and asked for additional criticism of the report by letter for the benefit of the 1917 committee. He laid particular stress on the importance of service data for treated timber, and asked that the members fill in the information on the data sheets whenever they had occasion to rebuild track. He also questioned the value of treating yellow-pine ties when they were used in paved streets. He said that his company had removed untreated yellow-pine ties from track in paved streets which had been down from sixteen to twenty-two years. In rebuilding this track approximately 60 per cent of the ties were reused. In Brooklyn he had also found that Georgia-pine ties would last only three years in track laid in cinder ballast. At this point the report of the way committee was approved and President Lindall called for the report of the committee that had attended the American Good Roads Congress. This was presented by J. M. Larned, Pittsburgh Railways, Pittsburgh, Pa., and it was received as information. An abstract appears in the proceedings of the American Association. Before adjourning the meeting President Lindall announced that arrangements had been made for advancing the final session of the Engineering Association from 2 o'clock Friday afternoon to 9 o'clock Friday morning.

## Thursday's Session

At the Thursday afternoon session of the Engineering Association the report of the committee on equipment only was presented as more time was consumed in its discussion than was anticipated.

### EQUIPMENT

The report of the committee on equipment covered eleven subjects, therefore it was necessary to consider some of these in a rather preliminary way, while others were reported in detail. After a thorough investigation of the question of revising the steel wheel designs, the committee drew the following conclusions: Wheels of a diameter of 26 in. and under should have a rim thickness of 2 in., and wheels of 28 in. in diameter up to 36 in. in diameter should have a rim thickness of  $2\frac{1}{2}$  in. Wheels with diameters of 35 in. and 37 in. were eliminated from the designs because these sizes were not generally used. Although the equipment committee had prepared and recommended a revised contour of wheel tread and flange, it could not reach an agreement on these changes with the way committee, therefore the standards committee approved the new designs subject to an amended report being made at the convention. Agreement was reached, however, with the way committee that the present coning of the tread would be maintained at 1 in. in 25 in. The question of flange contour is still in controversy.

A revision of the standard design of brakeshoes, brakeshoe heads and keys was also undertaken by this committee to obviate the uneven wear of the shoes and the rapid wear of portions of the face of the brake head in contact with the shoes, resulting from insuffi-

cient wearing area. An investigation developed the fact that manufacturers were not following the association's standards for brakeshoes except in a general way, so that the revision was taken up with them. While the designs were changed, they in no way affect interchangeability with the present designs. A summary of the changes follows:

A plate type of brake head was proposed, *i.e.*, a head which covers the full bearing portion of the brakeshoe except for the indentations for end and center lugs and slight clearance recess; head design with square ends to fit end stops; a  $\frac{3}{16}$ -in. clearance was provided between top of lug on shoe and brake head; the location of the center line of the key lug on narrow-tread shoes was corrected; the lip of the shoe flange was omitted at the center for a distance of 50 per cent of the total length of the shoe; the clearance was indicated around the flange of the wheel; standards were included for brake heads, brakeshoes and keys for wheels 26 in. in diameter and under, and unflanged brakeshoes were eliminated from the standards, investigation indicating that there were very rarely used for electric service, and where required to meet special conditions it was recommended that the members use M. C. B. standards. The new proposed designs were illustrated in appendix to the report and they were approved by the standards committee.

This committee also investigated the question of revising the standard design of axles to provide for the recent development in small-size motors. In its investigation of this subject the committee had the assistance and co-operation of representative motor and truck manufacturers, and the new proposed standards were illustrated in an appendix to the report. In connection with the design of these axles the report states that a very careful analysis of the stresses indicated that the former capacity ratings were somewhat high for ordinary annealed carbon steel and a reduction for the various sizes was made. The committee's investigation also developed the fact that while the present axle standards have been very desirable from the standpoint of standardizing the motor fit, excepting for heavy electric traction and interurban service, the standards indicated could not be used, because the lengths were too great for city service. To take care of this situation, two designs for  $3\frac{3}{4}$ -in. x 7-in. axle were added, with journal centers of  $69\frac{1}{4}$  in. and 72 in. respectively. The former will meet the requirements of the driving axle for maximum traction trucks, and the latter for the heavy four-motor equipments operated in city service. To meet the requirements for small-size motors and light-weight cars, axle designs were added, one for  $3\frac{1}{2}$ -in. and one for 4-in. motor fit, both having  $3\frac{1}{4}$ -in. x 6-in. journals spaced at  $69\frac{1}{4}$ -in. centers. These were recommended as standard designs and they were approved by the standards committee.

Car ventilation was also investigated and the committee reported that this subject revealed the fact that opinions differ as to the requirements for good ventilation and few if any of the theories or proposed requirements have been generally accepted. In some localities, state and municipal authorities have specified that cars must meet certain specifications, and a large number of electric cars have been equipped with various ventilating systems in an endeavor to meet these requirements.

In several cases authorities now admit that their methods of meeting these requirements are not practical from an operating standpoint. Due to this unsettled state of the art, the committee believed that definite recommendations could not be made, and, therefore, confined its report to a general review of the subject.



Under the subject of lighting electric cars, the report calls attention to the fact that during the last two years special attention has been given to the question of scientific reflection and diffusion of light, and to the fact that investigations have demonstrated that the tungsten wire lamps are superior to the old carbon filament lamps both as regards efficiency and economy. Generally, however, the results of the scientific analysis were so dependent upon the construction of the car, the shape and color of the ceiling and other reflecting parts, as well as on the quantity and quality of adjacent light absorbent surfaces that the committee concluded it would be impractical to adopt any definite standards. It therefore recommended that all member companies be urged to give the matter of car lighting the careful and scientific study it deserved.

Since the manufacturers could not agree on what sizes of carbon brushes could be recommended as a standard for street railway motors, the committee deemed it inadvisable to take any action on this subject.

M. C. B. brasses for heavy electric traction were designed and submitted in this committee's report to obviate the difficulties encountered in the operation of M. C. B. journal bearings on heavy, high-speed equipments, particularly in connection with motor axles where the higher brake-shoe pressures become an important factor and result in abnormal wear due to comparatively heavy side thrusts. The committee found that a number of prominent member companies had developed a form of high-speed journal bearing which had proved satisfactory in overcoming these difficulties. In considering this subject, however, the committee deemed it highly desirable to have the high-speed bearings interchangeable with M. C. B. standards, not only insofar as the bearings themselves were concerned, but as regards the modifications in the journal boxes and supplementary end-thrust facilities. The details of these proposed high-speed journal bearings were illustrated in an appendix accompanying this report, and included those developed for 3 $\frac{3}{4}$ -in. x 7-in., 4 $\frac{1}{4}$ -in. x 8-in., 5-in. x 9-in., and 5 $\frac{1}{2}$ -in. x 10-in. sizes of journals. Journal thrust plates were also designed and submitted with the report, for applying on 3 $\frac{3}{4}$ -in. x 7-in. and 4 $\frac{1}{4}$ -in. x 8-in. sizes of journals, and one was designed for both the 5-in. x 9-in. and the 5 $\frac{1}{2}$ -in. x 10-in. sizes.

Limit-of-wear gages for the association's standard flange contours were also designed by the equipment committee for the 1-in. thickness of flange and the 1  $\frac{3}{16}$ -in. thickness of flange. These designs were submitted in an appendix to the report, and they were approved by the standards committee.

A trolley catcher socket which is essentially the same as that known as the Keystone catcher, manufactured by the Electric Service Supplies Company, was adopted by the committee as standard and approved by the standards committee. Before its adoption, however, the sanction of the manufacturer was obtained, as well as permission for other manufacturers to make their style of trolley catchers fit this socket.

After analyzing the replies received from a number of representative electric railroads on the subject of car painting, such a wide variation in the methods employed was found that it was practically impossible to formulate any set of specifications which would be applicable to the various conditions or acceptable to the various member companies. Some companies spend considerable money to obtain a very smooth surface for the color and varnish coats, and others finish their cars with the principal object in view of obtaining protection from the action of the elements. The committee also found that some companies were forced to paint their cars quickly on account of limited shop space and the lack of extra equipment, while others were more favor-

ably situated in these respects. The report also took up the various enameling processes, and the committee recommended that the accelerated drying of paints and varnishes receive more attention from member companies than they have in the past, because it believed that a closer study would develop greater advantages and result in extending its use.

In the investigation of rail corrugation in its relation to the use of rolled or forged-steel wheels versus the use of chilled iron wheels, the committee made observations on a number of large railway properties and discussed the subject with the engineers and the officials of these roads. It was found that some of the lines using rolled or forged-steel wheels exclusively were free from corrugations, while others showed corrugations in various stages of development. Likewise some of the roads using only chilled cast-iron wheels were free from corrugations, while others showed corrugations as pronounced as those found on any of the roads using steel wheels. It was the consensus of opinion of the engineers of some of these properties that one type of wheel was no more conducive to rail corrugation than the other. As a result of these investigations the committee reported that nothing could be found to indicate that one type of wheel more than another was responsible for rail corrugation.

#### PLAN OF COMMITTEE WORK AND APPOINTMENTS CRITICISED

At the close of this report the equipment committee placed itself upon record as opposed to the detailed consideration and recommendation of matters where it was evident from the start that no final determination could be made that would be conscientiously observed or advocated by individual members. In other words, it did not care to put forth the ideal as an ideal, and confine the consideration of the subject to historical sketches or reviews without adding definite recommendations. This committee also expressed itself of the necessity of some arrangement whereby its work could be continued from year to year, and with less interruption between the time of rendering reports and assignment of subjects for the ensuing year. It recommended that some more definite plan of continuing membership in committees be considered.

In connection with the report Mr. Gove said that next year a less number of subjects should be assigned and therefore more time would be available for consideration. The subjects of revision of wheel design and contour and tread and flange of wheel brought forth a lively discussion on flange dimensions and their relation to rails.

James Wilson, National Car Wheel Company, did not see the need for reducing the thickness of flange. There were many roads using flanges 1  $\frac{3}{16}$  in. thick and in Baltimore flanges 1 $\frac{1}{4}$  in. thick are used. H. H. Adams, Chicago Surface Lines, called attention to the growth in the use of steel wheels. Flanges on street car wheels were formerly thickened to introduce more grey iron and thus increase the strength in the flange. He thought that a compromise design to suit the requirements of both iron and steel wheels would eventually be reached. W. A. Bennett, Griffin Wheel Company, did not think that thicknesses of 1  $\frac{3}{16}$  in. and 1 $\frac{1}{4}$  in. were unusual. Wheels had been used in Peoria with a flange thickness of over 1 $\frac{1}{4}$  in.

N. B. Trist, W. A. Bennett and R. H. Dalgleish next discussed the wear on the back of flanges and the relation of flanges to guard rails. Mr. Dalgleish said that the radius of throat on  $\frac{5}{8}$ -in. and  $\frac{7}{8}$ -in. flanges could not be the same or there would be no tangent. He thought there would always be a demand for two sizes of flange and perhaps for three sizes.



Mr. Adams said that in Chicago a taper on the tread of one to sixteen was used on steel wheels and that the average mileage of wheels from January to May, inclusive, had been 110,000. These were 34-in. wheels worn to 30-in. minimum diameter. He considered this a fairly good life for wheels in city service.

Mr. Dalgleish had conducted experiments with wheels of various tread tapers and found that an increase in taper had brought about an increase in the life of the wheels. He said, however, that if in conjunction with the way committee standards were adopted which assured a tread bearing over one-half the rail head in extent then taper would not be an element of importance. R. C. Cram, Brooklyn Rapid Transit System, said that the question of flange thickness was one to be determined largely from usage and experience.

Ralph D. Hood, Haverhill, Mass., held that in the association discussions and studies the aim should be to establish standards for the future to which all properties when reconstructing could work. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., argued for a larger flange and corresponding flangeway. Mr. Gove said that the one-wear wheel was increasing in popularity and consideration for that also must be made.

After further discussion the committee recommendation on this matter was approved.

Mr. Adams did not think that the committee had gone far enough in shortening axles. Every axle possible should be shortened because of the need for saving weight. A shorter axle meant that every cross-piece in the truck could be shortened. F. R. Phillips, Pittsburgh Railways, said that the committee should not overlook those several large companies which operated wide-gage track. The present standard axles can now be used with wide gage equipment, but if they were shortened it would mean new axle designs. The committee's recommendation on axles was then approved.

After an abstract had been presented by Mr. Gove, the association next approved the committee's recommendations regarding the standardization rules of the A. I. E. E.

As previously mentioned in regard to electric-car ventilation, the committee on this subject held that definite recommendations could not be made at this time, and therefore confined its report to a general review of the subject.

Mr. Adams recited his experience with ventilation intakes. Floor intakes brought about difficulty from street dust, but on studying the subject he had found a point at the side of the car where there was little dust. Therefore the intakes on later cars had been located on the sides of the cars, and this was found satisfactory.

That part of the report on lighting was read by W. E. Johnson. No discussion followed.

On the subject of carbon brushes, E. H. Martindale, National Carbon Company, Cleveland, Ohio, said that the Electric Power Club and the carbon brush manufacturers had been working toward common standards which had been submitted to the A. I. E. E., and which, after further consideration, would no doubt be submitted to the Engineering Association.

Mr. Gove then read an abstract of the committee's report on the M. C. B. brass for heavy electric traction. L. M. Clark, Indianapolis Traction & Terminal Company, pointed out that certain changes were necessary in design in order to facilitate the removal of the brass from the box. These could easily be made and, therefore, the association approved the committee's report and passed an amendment providing for the changes.

W. E. Johnson, Brooklyn Rapid Transit System, read the section of the report on the design of limit-of-wear gage for standard flange contours. F. J. Foote, Ohio Electric Railway, inquired why two general designs were shown. Mr. Johnson replied that the 1 13-16-in. gage followed the Central Electric Railway Association designs, but that the general shape of both gages could be made uniform. The association approved the designs recommended.

Mr. Johnson stated that on account of the patent situation, the committee wished to withdraw its recommendation on the subject of design of trolley-catcher socket. The sections of the report on painting of cars and consideration of a code of safety rules were read, as was also that on the investigation of rail corrugation in its relation to the use of rolled and forged steel wheels as opposed to the use of chilled cast-iron wheels.

Owing to the lateness of the hour, the report of the committee on buildings and structures was postponed to the Friday afternoon session.

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## Friday's Session

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This session of the Engineering Association was opened with the report of the committee on buildings and structures, which had been carried over from the previous session.

### BUILDINGS AND STRUCTURES

Of the topics assigned for its consideration this year the committee on buildings and structures found the following the most fruitful for study: Designs for fences; general specifications and form of contract for railway structures; provision for contraction and expansion in restrained concrete structures, and oil houses and their equipment.

Under the first head a number of dimensioned drawings of fences were given, together with brief statements of their characteristics. The general specification and form of contract which had been recommended for adoption in 1915 were submitted again in revised form. The revisions had been made after securing comments from many member companies, and the committee stated that it had now no hesitancy in submitting the form for adoption as a recommended specification and form of contract.

On the subject of providing for expansion and contraction in restrained concrete structures the committee recommended that its further consideration be suspended for the present on account of the exhaustive nature of the 1915 report. However, some drawings were submitted showing a few special problems that have occurred in actual practice and the methods of solution. One showed a method of waterproofing either a transverse or longitudinal expansion joint on a bridge structure. The success of these joints is believed to be due to placing rolls of plastic waterproof membrane in the copper "V" pieces which connect the end of the bridge and the abutment before filling the joints with plastic waterproof compound. The membrane gives the mass more body and allows the use of a softer mastic than otherwise.

Another drawing, reproduced herewith, showed a method of waterproofing a subway manhole where a sewer or water pipe of necessity passes through the structure and also several special cases of waterproofing expansion joints.

A third drawing showed a method of waterproofing the bases of iron or steel columns, the following explanation being given: It is well known that when



concrete or other protection is built up around columns in streets or other exposed places, due to changes in grade or from other causes, in order to act as wheel guards or other protection, it is impossible to maintain a tight joint between the concrete and metal due to difference in the coefficient of expansion of the two materials, with the consequent rapid deterioration of the metal due inevitably to moisture collecting between the two. It so happens that the peculiar properties of some waterproofing compounds, especially that used in the case illustrated, is that the waterproofing material can be made to adhere equally well to both the metal and concrete, consequently positively sealing the opening, no matter how small. Of course, the compound is applied to the steel before pouring the concrete. This makes no difference as it has always been proved that the concrete, when set, has become firmly bonded to the waterproofing compound.

The fact that some materials bond to steel and iron has been found to eliminate the annoying troubles sometimes experienced in keeping steel work painted for appearance or for protection. Two examples illustrate this, one being the case of exposed bottom flanges of a bridge or floor structure and the other being an otherwise non-protected girder or beam. One treatment with waterproofing compound will outlast many coats of paint.

The last topic covered by the committee was oil houses and their equipment. A form of oil house was recommended to meet the requirements of municipalities and insurance companies. Two forms were suggested, one with tanks above, and the other with the tanks below the floor. It was stated that a list of manufacturers of oil pumps, metal tanks, waste bins and similar apparatus could be obtained from the secretary of the association or from the local board of underwriters having jurisdiction.

The report was signed by C. F. Bedwell, chairman; R. C. Bird, H. E. Fink, C. S. Kimball, James Link, F. F. Low, William Roberts, H. G. Salisbury and H. G. Throop.

G. W. Palmer, Jr., Bay State Street Railway, Boston, Mass., opened the discussion and told of his company's experience in preparing a contract form similar to this one. He said that they had gone to a great deal of trouble to develop a form of contract which was almost identical with the one submitted in the committee report. If the committee's form had been available at the time his company was endeavoring to develop one, it would have saved an immense amount of detail work.

H. H. Adams, Chicago Surface Lines, speaking as chairman of the standards committee, said that it had not acted on the recommendation of the buildings and structures committee because his committee did not deem it a good policy to include matter of this kind in the manual. The contract form submitted by the 1914 and 1915 committees had been sent back because the standards committee did not think it suitable for adoption as a recommended specification. However, as the general specification form of contract already appeared in the Manual under the heading "Miscellaneous Methods and Practices," Mr. Adams agreed that the form as revised by this committee should replace the one now in the Manual. Accordingly the recommendation of the committee was approved and the remainder of the report accepted.

#### HEAVY ELECTRIC TRACTION

The committee on heavy electric traction recommended further consideration of the standard diagram for clearance of overhead working conductors and stated that it approved the proposed standard clearance dia-

gram for block signals submitted by the block signal committee. The committee indorsed the standardization rules of the American Institute of Electrical Engineers and gave an outline of its activities in connection with the proposed safety code of the United States Bureau of Standards. In addition there were submitted tabulated data regarding electric locomotives used on main line railroads in America and in Europe similar to those submitted in last year's report, these tables having been revised and corrected where necessary. A new table covering data regarding electric locomotives on the various interurban railways in America was presented. The report was signed by E. R. Hill, chairman; E. B. Katté, Hugh Hazleton, W. S. Murray and C. H. Quinn.

G. W. Palmer opened the discussion by calling attention to the fact that the power distribution committee had not accepted the standard rules of the A. I. E. E. and the heavy electric traction committee and had approved them without change. C. L. Cadle, chairman of the power distribution committee, explained that its action on the standardization rules had been governed by the fact that they did not conform to the standards already adopted by the association. Mr. Hill explained that his committee's action was only intended as a general indorsement of the rules. This conflict in the action of the two committees was therefore referred to the executive committee for reconciling the differences. This closed the discussion and the report was accepted.

C. W. Stocks next read the report of the committee on electrolysis, which was simply one of progress, and it was received as information. C. R. Harte, Connecticut Company, New Haven, Conn., presented the report of the committee on resolutions, and H. H. Adams that of the committee on nominations, which were unanimously approved.

President Lindall, before turning the gavel over to incoming President F. R. Phillips of the Pittsburgh Railways, thanked the members for the assistance they had given him during the past year and urged their co-operation for the new president. R. C. Cram, Brooklyn Rapid Transit Company, Brooklyn, N. Y., and Mr. Cadle escorted President-elect Phillips to the chair. In accepting the honor conferred on him Mr. Phillips said that since many of the committees believed that too many subjects had been assigned to them from year to year, it would be his policy to reduce the number so that more attention could be given to the details of the subjects considered.

#### NEW OFFICERS

The report of the nominating committee was then presented, and in accordance with its recommendations the following were elected: President, F. R. Phillips, superintendent of equipment Pittsburgh Railways, Pittsburgh, Pa.; first vice-president, G. W. Palmer, Jr., electrical engineer Bay State Street Railway, Boston, Mass.; second vice-president, W. G. Gove, superintendent of equipment Brooklyn (N. Y.) Rapid Transit System; third vice-president, E. R. Hill, consulting engineer Norfolk & Western Railway, New York City; secretary-treasurer, E. B. Burritt, 8 West Fortieth Street, New York City; members of the executive committee, the officers and C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. S.; C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y.; C. F. Bedwell, assistant engineer Public Service Railway, Newark, N. J.; J. W. Welsh, electrical engineer and traffic agent Pittsburgh Railways, Pittsburgh, Pa.

This report of the nominating committee was signed by Paul Winsor, chairman; E. O. Ackerman, William S. Twining, A. T. Clark and S. L. Foster.



# Transportation and Traffic Meetings



PRESIDENT H. A. NICHOLL

In Addition to the Committee Reports, the Association Had a Number of Contributed Papers, Which Added to the Interest of the Meetings. The Discussion Brought Out Many Valuable Ideas Regarding the Training of Men for Supervisory Positions, the Practical Aspects of Public Work, Etc.

**T**HE annual meeting of the Transportation & Traffic Association was called to order by President H. A. Nicholl, who first read his annual address. An abstract of this follows:

## PRESIDENT NICHOLL'S ADDRESS

At the opening meeting of the Transportation & Traffic Association held Monday afternoon, President Nicholl spoke first of the convention last year at San Francisco, which he said not only gave an opportunity to Eastern members to see a wonderful country under most favorable conditions, but the place at which it was held was particularly convenient for the members located west of the Rocky Mountains. The great hospitality of these members was greatly appreciated and will long be remembered. The large number of jitneys seen in the Western cities impressed those who participated in the trip and the Eastern members of the association sympathize with those companies which have to contend with this unfair competition.

President Nicholl then spoke about the change in the organization of the executive committee by which the first vice-president takes a more active part in the work of the association and will report to the president on June 1 of each year when he will recommend a list of appointments for the new committee on subjects. He will also report at the last meeting of the executive committee a tentative list of the recommended committee appointments for the ensuing year. In accordance with this change, the new subjects committee has already been appointed for the ensuing year and will undoubtedly be able to assign the work to the other committees earlier than heretofore. Other changes in the organization of the Association consist of the abolition of the board of accident control and the appointment in its stead of a joint committee designated as the joint claims-transportation committee, the appointment of a committee on the operation of motor vehicles, one on company publications, a joint committee with the Engineering Association to co-operate with the signal committee of the American Railway Association to secure a uniform code of rules for block signals and to co-ordinate the work of the two associations, and the committee on the cost of rush-hour service.

Mr. Nicholl then spoke briefly of the work of each committee to report this year and of the special papers which had been prepared for the program. He also urged during the year the co-operation of the different member companies with the committees and the attendance of members at meetings of committees.

## PROGRAM

### MONDAY

Annual Address of the President.  
Annual Report of the Executive Committee.  
Annual Report of the Secretary-Treasurer.  
Reports of committees:  
Standards—L. H. Palmer, chairman.  
Construction of Schedules and Time-tables—Edward Dana, chairman.  
Joint Session with Claims Association.  
Reports of committees:  
Claims-Transportation—R. P. Stevens, chairman.

### TUESDAY

Reports of committees:  
Passenger Traffic—J. K. Punderford, chairman.  
Uniform Definitions—J. V. Sullivan, chairman.  
PAPER—"The Development of Schedule Makers," H. C. Donecker.  
PAPER—"Training Men for Supervisory and Executive Positions," L. C. Bradley.  
Joint Session with Engineering Association.  
Reports of committees:  
Block Signals—J. M. Waldron and J. W. Brown, co-chairmen.  
Standards, Engineering—(On recommendations contained in above report).  
Transportation-Engineering—F. R. Phillips and W. A. Carson, co-chairmen.

### WEDNESDAY

Joint Session with Accountants.  
Reports of committees:  
Cost of Rush Hour Service—J. V. Sullivan, chairman.  
Fares and Transfers—C. S. Ching, chairman.  
PREPAYMENT SYSTEMS—General discussion.  
Reports of committees:  
Express and Freight Traffic—F. D. Norviel, chairman.  
ADDRESS—"Some National Issues in Local Street Railway Franchises," Prof. Clyde L. King.

### THURSDAY

Reports of committees:  
Rules—C. E. Morgan, chairman.  
PAPERS—"Company Publications": "Their Use and Value," F. W. Hild, T. S. Wheelwright. "Their Preparation and Publication," Leake Carraway, James H. Braden.  
General discussion.  
General business.  
Election of officers.  
Installation of officers.

In conclusion he referred to the immense increase in the number of automobiles and consequently in accidents from them, and expressed his belief that an effort should be made by the association as well as by the parent association to see that proper legislation is enacted, making it a penal offense for an automobile to be operated across a steam or electric railway track without first coming to a stop to see that the way is clear and to be operated by anyone who is not a licensed chauffeur. Automobile accidents in cities from which reports were available showed that up to Sept. 1 of this year 1040 persons had been killed and more than 8000 injured, a larger number by far than those who had been killed and injured in the Zeppelin raids in England. This indicates that the automobile is much more dangerous than the Zeppelin.

In conclusion Mr. Nicholl expressed his appreciation for the co-operation of the officers, secretary of the association and the committeemen and members as well as for the honor conferred upon him at San Francisco.

Following the president's address, Secretary E. B. Burritt presented the report of the executive committee, which consisted of minutes of the two meetings held during the year. He also read his report as secretary-treasurer. From this it appeared that the committee had expended about \$1,425 out of \$2,750 appropriated. The membership on Sept. 30, 1916, was 201 individuals,



a loss of 272 as compared with Nov. 1, 1915. Two hundred and forty-eight had been transferred to company section membership, of which company section members there were, on Sept. 30, 669.

#### TRANSPORTATION & TRAFFIC STANDARDS

L. H. Palmer, Eastern Pennsylvania Railways, Pottsville, Pa., then presented a report of the committee on standards.

The committee on standards stated in its report that, at the stated meeting held in August at New York City, formal action could not be taken by the committee because no quorum was present. However, the reports of six standing committees had been considered and had been forwarded to the executive committee of the association with the statement that, in the opinion of the members of the standards committee attending the stated meeting, the reports were in form to be submitted to the convention. The report stated also that a start had been made on the compilation of a syllabus covering the proceedings of the association since its inception, and it was hoped that this work would be completed during the ensuing year. The report was signed by L. H. Palmer, chairman; J. N. Shannahan, vice-chairman; A. H. Ford, C. H. Harvey, C. V. Wood, H. C. Donecker, J. K. Punderford, F. D. Norviel, N. W. Bolen, C. E. Morgan and Edward Dana.

The discussion of this report was opened by H. C. Donecker, Public Service Railway, Newark, N. J., who emphasized the point that the association is not getting the most possible from its committee work, although he did not criticize the work of the present committees. Operating men are busy and have difficulty in getting to committee meetings, so that even though committee members are carefully selected the results are not always satisfactory. Consistency is an important factor in committee work. It is evident that in the past the attempt has been made to do too much committee work, and in the future the committee work will be simpler. He expressed his belief that the member companies should consider the committee work of employees to be a part of their regular duties.

L. C. Bradley, Houston (Texas) Electric Company, referring to the work of the standards committee, said that this committee is in a position to understand the detail of committee work and its comments should be valuable. Men who accept committee appointments should realize their responsibilities. Committee work is an honor and a duty, and the success of the association work depends on faithfulness. C. Loomis Allen, Allen & Peck, Syracuse, N. Y., said that the association had done fine work but so far has merely scratched the surface. Referring to the suggestions of the committee, R. B. Stearns, Milwaukee Electric Railway & Light Company, said that executives do not lack interest in the work of the association. Although representatives are harassed with problems, managements are always willing to assist in solving problems, particularly those of this association. The trouble with the committee work has been that the shots are too scattered and the results indecisive. Some subjects should be closed out and a follow-up system of committee work should be inaugurated.

J. E. Gibson, Kansas City (Mo.) Railways, referred to the difficulty of getting full attendance of committee meetings. Companies should send men not only to convention but also to committee meetings. H. B. Potter, Boston (Mass.) Elevated Railway, suggested that members of the executive committee should be assigned to ex-officio position on committees, where they could give valuable assistance. Mr. Stearns stated that while this year's committee work was very satisfactory, most of

the work was done by the chairmen. J. E. Duffy, New York State Railways, Syracuse, N. Y., thought that geographical restrictions prevent regular attendance at committee meetings. A. Swartz, Toledo & Western Railway, Toledo, Ohio, suggested that members might voluntarily express their preference for committee work. J. L. Adams, Philadelphia & Western Railway, Upper Darby, Pa., believed in small committees, but J. R. Harrigan, Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., opposed a reduction in the size of committees for fear of not having representative membership. Mr. Donecker explained that the committee recommended was intended to secure closer co-operation between the member companies and the committees. The report of the committee was then adopted.

#### CONSTRUCTION OF SCHEDULES AND TIME-TABLES

The committee on construction of schedules and time-tables, besides giving a summary of the work of previous committees on this subject, entered a plea for more permanence in the membership of committees. This committee has a membership of seven, but during the past seven years thirty-three different individuals have served on the committee. The longest period of service was three years, and two members served for this time. Nine members served for only two years, and twenty-two members served for only one year.

The first subject considered by the committee was the skip-stop development. Of sixty-eight companies replying, thirty-five companies as yet have made no move to reduce the number of stopping places on their lines, whereas thirty-three have made such an effort. Of the number that had tried the plan, fifteen indicate in a general way that a net saving has resulted, but eighteen had compiled no definite data. The committee believes that any method of operation such as this, which provides a more efficient service, must ultimately be successful even where there is a minority opposition, but, like rerouteing, it is often difficult to introduce, and where marked economies result, the companies could well allow a portion of the saving to revert to an increase in the service and show the public that this has been done. The committee also commends the *ELECTRIC RAILWAY JOURNAL* for reprinting in folder form several vital articles on this subject published in the issue of Jan. 1, 1916.

Four methods of skip stop are classified, namely: (1) The removal of every other stop inbound and outbound, placing the outbound stops at streets where the inbound stops have been eliminated. (2) The elimination of certain stops during rush hours by stenciling white bands on the poles with the statement that within certain hours the cars will omit that stop. (3) The designation by signs on the cars that at even or odd numbered streets, the car will not stop, as the case may be. (4) The operation of express cars with so-called locals.

The company urges the adoption of a standard inter-urban time-table and submitted a form which it recommended. Of the ten companies which replied to requests for criticism on the table, four were very much opposed to the practice of showing trains in one direction on one side of the table and those in the opposite direction on the reverse side. They preferred that the stations be placed in the center of the sheet, and the time of trains in one direction be shown to the left reading down and the time of trains in the opposite direction shown to the right reading up. The committee cannot agree that there is sufficient to be gained by this arrangement to warrant it, as it thinks the practice of reading up an unnatural one.

In its study of running time, wide variations were



found. Some companies report that they check running time between specific points as often as three times a day, while others check once a year only. Various methods are used for checking. No change in running time throughout the day or year was reported by twenty-eight companies, whereas forty-four report variations during the rush hours or after 8 p. m., and one company varies its running time seven times a day. The importance of the subject to economical operation is emphasized, and the committee says that it could have found work enough to concentrate its entire energies upon this subject or upon any one of the subjects assigned to it.

Under the study of traffic regulations, a summary is given of various municipal traffic regulations that are in force. Attention is also called to the Standard Code of Traffic Regulations adopted by the Safety-First Federation of America. In the opinion of the committee the efforts of this organization in this direction should be approved.

The report was signed by Edward Dana, chairman; J. P. Kineon, Herman E. Hicks, H. F. Fritchs and Fred Cooper.

The discussion was opened by J. J. Dempsey, Brooklyn (N. Y.) Rapid Transit System, who brought out the importance of careful study of the skip stop and was followed by J. V. Sullivan, Chicago (Ill.) Surface Lines, on the same topic. Mr. Sullivan said that education on the skip stop is necessary. The skip stop is a move in the right direction, and a study of several cities where the number of stops have been diminished showed that the public would adapt themselves to the change. Insistent property owners sometimes oppose these skip stops and compromises should be used instead of arbitrarily locating stops. The public should be fully informed of the savings and explanations of the advantages to the public should be made. Experiments should be continued long enough to give the plan a fair trial, and stops should be eliminated with reference to the effects on business districts. Mr. Dana gave an example of the solution of the general problem where local and express two-car train schedules had been introduced.

R. T. Sullivan, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, pointed out that skip stops increase the inconvenience of service, which is important in view of the auto competition. On the same point J. F. Starkey, Lake Shore Electric Railway, Sandusky, Ohio, said that jitney competition in Sandusky, Ohio, had impressed on the management the importance of stopping as frequently as possible. Mr. Stearns indorsed the recommendations of the report, and stated that it represented an excellent piece of work. G. A. Richardson, Puget Sound Traction, Light & Power Company, Seattle, Wash., said that the skip stop was used some time ago in Seattle, and that the people in outlying districts liked it. He wanted to know, however, how the people in the inner part of the skip stop zone could be pleased. Alexander Jackson, Public Service Railway, Newark, N. J., said that the success of the skip-stop system will depend largely on the manner in which it is inaugurated, it should be done on one line at a time, and should begin on a line with short blocks. Suitable signs should be erected, and there should be considerable advertisement prior to the installation of the system. Express service could hardly be operated on lines where the headway is less than 5 minutes.

Regarding interurban time tables, Mr. Jackson took exception to a number of points in which he thought the form submitted by the committee was deficient. These referred to durability, the numbering of turnouts on

interurban lines, and a number of typographical details. He objected to the printing of time tables in such a form as to show the trains in one direction on one side of the table and those in the opposite direction on the reverse side.

Before proceeding to the joint meeting with the Claims Association, President Nicholl announced the appointment of the following committees: On resolutions, J. N. Shannahan, E. C. Spring and P. N. Jones. On nominations, Dana Stevens, H. C. Page and S. W. Greenland.

#### CLAIMS-TRANSPORTATION

The joint committee on claims-transportation presented a progress report stating that it was investigating the cost of moving-picture reels and was developing a plan of operation for their use in electric railway safety work, since it had been found that seventy-three member companies desired to use such pictures, providing they could be displayed at a reasonable expense. As soon as full information on this subject has been obtained it will be put in the form of a further report and a recommendation by the committee. The committee had nothing to recommend at the present time in connection with co-ordination with the street traffic committee in the general safety-first movement. The report was signed by R. P. Stevens, chairman; E. F. Schneider, Edward A. Maher, Jr., W. F. Weh, S. B. Hare and J. J. Reynolds.

Mr. Stevens explained that the report was a progress report. The committee had conducted a great deal of correspondence with moving picture concerns, but these manufacturers were so busy that they had not given the matter as full attention as the committee hoped they would later. The committee had also corresponded with railway companies which had prepared such films, but with one exception these companies had refused to loan their films. Some 100 reels, however, were available at present. Seventy-three railway companies had written that they would be interested if films could be obtained at a reasonable expense.

E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa., said his company had had considerable experience with reels and had made one of its own at a cost of \$2,300, although this reel was for advertising purposes and not an accident reel. His company had thought of preparing such a reel, but realized that it would be very expensive and after once shown it would be obsolete. It was found better to hire reels than to make them or have them made. There was also the question as to how these reels should be shown. At first the moving picture people raised some objection because the exhibits made of these reels were free. The company told them, however, that being a different class of picture, it would attract people who rarely or never went to moving picture shows and encourage the regular business, so that the company had no difficulty in hiring halls and operators. The speaker recommended hiring experienced operators as economical in the long run. He believed that the pictures did a great deal of good.

H. V. Drown, Public Service Railway, Newark, N. J., said that his company in 1911 had a reel made by the Edison Company and later this reel was released throughout the country. It was produced at no cost to the railway company except the loan to the picture company of its equipment, men, etc. This year the company had endeavored to repeat the contract with the Edison Company, but was unsuccessful and had arrangements with another concern to produce a reel. The experience of the company had been very satisfactory with these reels. It should be remembered, however,



that they are perishable and wear out, and that may be one reason why companies do not care to loan them.

Alfred Sweeney, Portland, Me., asked if it was considered worth while to show accident reels unless an educational campaign was followed. Mr. Spring thought that it was much better to carry on such a campaign at the same time.

H. M. Braun, East St. Louis & Suburban Railway, suggested that it was most desirable to educate the trainmen first before starting in to educate the public.

H. C. Mallon, Chicago Elevated Railway, said that three years ago some stereopticon slides were prepared on his lines and that the moving picture manufacturers had offered to make some moving picture films, but could give no guarantees that they would be shown in the theaters. It is hard to get realistic views because the men realize that they are only acting, and to be attractive the picture must be realistic. He believed, however, that it was possible to get such views and referred to some very good views made of the work by the telephone company in Chicago to show the problems of telephone operation.

## Tuesday Afternoon Session

The second session of the Transportation & Traffic Association meeting was held in accordance with the program, except that the paper of H. C. Donecker, Public Service Railway, Newark, N. J., scheduled for Monday was added.

### PASSENGER TRAFFIC

The first report presented was that on passenger traffic, which was abstracted by J. K. Punderford, Connecticut Company, New Haven, Conn.

This committee presented a digest of work of previous committees on the subject, and in its own report discussed first the subject of interline passenger traffic arrangement between interurban and steam roads. Of 120 member companies submitting answers to the questions sent out, 17 per cent have traffic arrangements with steam roads, and of these nearly one-third, or 5 per cent, have reciprocal arrangements with all steam roads in their respective territories. Although it is generally said that steam roads do not interchange with electric railways, sixteen of the large steam railroads do interchange to a greater or lesser extent. Most of the interline arrangements were initiated more by the steam roads than by the electric roads, but they have been remunerative and satisfactory to both, as well as to the public. Rates have been usually constructed on the sums of local fares, although in some cases arbitrarily constructed basing rates have been used. Most of the lines using these basing rates have established them by prorating on rates, although some have prorated on mileage. Outside of Iowa there has been very little exchanging of mileage with steam railroads. The committee recommends that renewed efforts be made by electric railway officials to extend their traffic arrangements with steam roads.

Although most electric railways report that they carry baggage free up to 150 lb. and up to \$100 value, the committee finds that some electric railways charge 25 cents for baggage of 150 lb., and believes that all should do so. It recommends, therefore, that a committee be appointed to meet with a like committee from the steam roads to establish a universal charge for the handling of baggage. It also recommends that through rates, when constructed on basing rates, should be prorated on mileage and that efforts be made to develop the interchange of mileage with steam roads.

The examination of the committee of the subject of open cars shows that the number of such cars in service is rapidly diminishing, and that practically all of the present users of such cars contemplate discontinuing their use, at least as rapidly as the equipment becomes unserviceable.

The committee also made an examination into rates charged for special car service, but finds an alarming lack of uniformity and one for which there is no justification.

The committee consisted of J. K. Punderford, chairman; B. E. Wilson, Charles Currie, E. M. Walker, J. S. Keys and P. P. Crafts.

In connection with the report, Mr. Punderford said that the committee had studied the subject of special car services, and found a great lack of uniformity as to rates charged by different roads for the same services. While the report contained no recommendations, he raised the question of the desirability of having a more rational basis for such services. C. R. Gowan, New York State Railways, Syracuse, N. Y., described the experience of his company in interline arrangements with the New York Central and the Ontario & Western. Some years ago his company had arrangements which placed it under the jurisdiction of the Interstate Commerce Commission. This proved quite a burden and was discontinued on March 1, 1913, since which date the arrangements have applied only to intrastate business. The results are very satisfactory, as a fairly good business is done, and the interchange arrangement is convenient to the public and hence promotes traffic. On the subject of advertising, Mr. Gowan thought each carrier should bear its own expense. The relations of his company with the steam roads have been pleasant. Regarding carrying of baggage he said that on one line baggage is charged for, while on another 150 lb. are carried free. Conditions determine this matter.

B. E. Wilson, New York State Railways, Rochester, N. Y., said that his company does some interchange business between Geneva and Rochester, this being intrastate only. He suggested that the subject of excess fare might profitably be studied to determine what companies can do to compel passengers to purchase tickets at stations. F. D. Norviel, Union Traction Company, of Indiana, Anderson, Ind., said that he was interested in the report because it covered conditions in the central states. He said that his company has interline arrangements with a number of steam roads. At first the local tariffs were combined, but now the tariffs are all practically the same as those prevalent among steam roads. He thought that the matter of special car rates must be controlled by local conditions.

The next speaker was J. F. Starkey, Lake Shore Electric Railway, Sandusky, Ohio, who said that his company gets a great deal of business from the Clover Leaf Line, and also has an arrangement with certain others. On the subject of advertising interline business, he thought that the initiating line should bear the expense. On his property, the special car rate is based on fifty passengers, a minimum rate of \$15 being charged. This he considered too low. Above 50 passengers the fare is prorated. He wanted to know if roads which carried baggage on limited cars found that handling baggage at stations interfered with schedules.

J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., said that on his road fifty passengers is a basis for special car rates with a minimum of \$25 total, and 50 cents per passenger. Baggage must be carried free by commission ruling.

Mr. Donecker put in a good word for the open car, objecting to the part of the report stating that the open



car is out of date. The Public Service Railway some years ago had no fixed policy regarding open cars, but after a careful study of local conditions had lately decided that open-car operation should be continued on certain lines. The railways must develop new business in competition with automobiles, the jitneys and amusement attractions. The open car can be a factor in this, and the experience of the past summer has shown that the new cars of this type recently put into operation on the Public Service Railway has enabled the company to meet this competition. The study of the subject should be carried further.

W. J. Whiteside, International Railway, Buffalo, N. Y., told of the success of his company in developing interline business in connection with excursions to Niagara Falls. He thought that it was only necessary to go after this business. Mr. Norviel, referring to the Niagara Falls excursion business, in which his company is interested, said that he had found that through routing of cars over electric lines pleased the people better than combined electric and steam interline arrangements. He also believed the subject should be studied further.

#### UNIFORM DEFINITIONS

The subject of uniform definitions was brought up for the fourth time by the committee that had been assigned in 1912 to develop a code of terms used in electric railway work, and a request was made that some definite action be taken on the matter by the convention. The committee presented as an appendix to its report a list of definitions that had been recast from the list submitted to the 1914 convention, these being offered for the approval of the convention. If, however, the work of fixing a more complete list was to be undertaken to the various associations in accordance with the request of the committee, it was proposed that action on the list be deferred until some future convention, when a general report on terminology might be ready for discussion. The report was signed by J. V. Sullivan, chairman; W. C. Greenough and Frederick Nicholas.

In order to carry out the recommendation of the committee, L. H. Palmer, Eastern Pennsylvania Railways, Pottsville, Pa., moved that the report be referred to the executive committee for consideration, with the recommendation that a committee of representatives of the several associations be appointed to study the whole subject of uniform definitions. This motion was carried.

After the presentation of the above report, H. C. Donecker, Public Service Railway, Newark, N. J., read his paper on "The Development of Schedule Makers." This is abstracted elsewhere.

The discussion of Mr. Donecker's paper was opened by Edward Dana, Boston Elevated Railway, who emphasized the importance of this subject in view of the fact that men must be able to explain the matter of schedules to public bodies. There are many factors involved in making of schedules, at least six weeks being required to turn over the timetables of a property like the Boston Elevated Railway. The company should provide reasonable forces for this department, and should realize that days or even weeks may be necessary in making comparatively small changes in the schedules. Many railway officials do not realize this fact.

Alexander Jackson, Public Service Railway, Newark, N. J., reiterated Mr. Dana's statement regarding the difficulty of turning over the timetable of a railway. So many details are involved in this, on a large property, that the six weeks specified by Mr. Dana are none too much. Much money can be wasted through the use

of improper timetables. They should be so made that the public is satisfied that the company is doing its best to give good service, that employees will be satisfied through reasonable wages and working conditions, and that due consideration may be paid to the income. There are evidently many problems involved in the making of schedules.

L. C. Bradley, Stone & Webster, Texas District, Houston, Tex., then read a paper on "Training Men for Supervisory and Executive Positions," which is abstracted elsewhere in this issue.

R. T. Sullivan, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, opened the discussion. He indorsed the qualifications set forth in the paper, but was of the opinion that hopeful-mindedness should be added. This quality was of vital importance in operating and supervisory officials in order to counteract the effect of ever-present public criticism. A cheerful and hopeful official makes a much better man for his company in its relations with the public, Mr. Sullivan said, while surprised at Mr. Bradley's statement of the failure of boyhood leaders to make good, was of the opinion that this was due to inordinate ambition. Selfish motives frequently governed their decisions rather than the general good of the company by which they were employed. Mr. Sullivan did not believe that limit should be placed on the class of employees to be trained for supervisory and executive positions, but that the road should be kept open to all who were ambitious. In closing he said that social gatherings were also very important in developing *esprit de corps*. This cannot be developed by facts and figures, but must come as a result of social intercourse. The day of the aloof, domineering executive officer is over, and he has been succeeded by one who looks upon his organization as a part of his family.

S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, complimented Mr. Bradley's paper very highly, and he was of the opinion that much of it should be preserved for subordinate employees. Continuing, he said that men are sometimes promoted from the ranks and their whole attitude of mind toward their subordinates changes. Frequently, this created ill feeling among the employees and trouble followed. Mr. Hutchins was of the opinion that the paper prescribed a method for training employees that would not produce that sort of an official.

At this point President Nicholl turned the meeting over to President Lindall of the Engineering Association, who in turn opened the joint session. The proceedings of this are covered in the Engineering Association report for Tuesday afternoon.

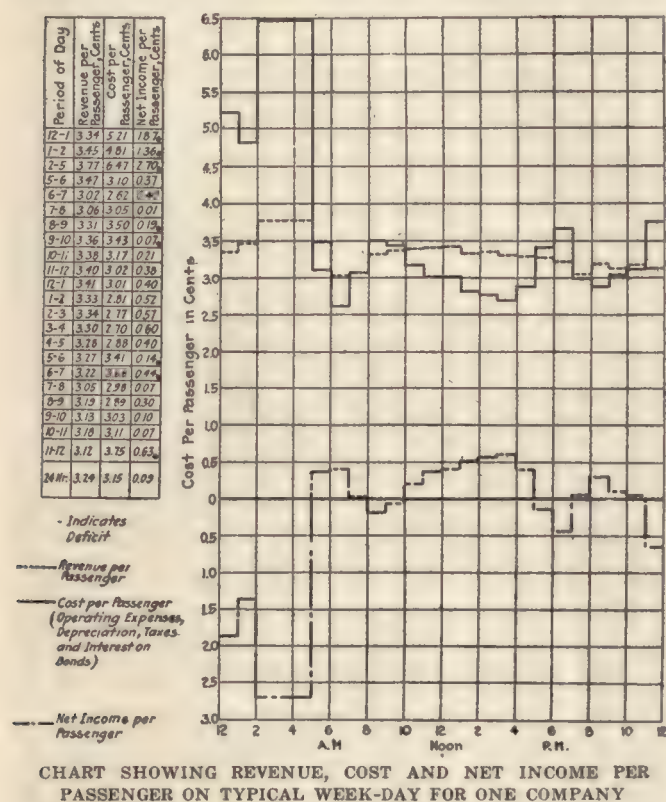
### Wednesday's Session

The Transportation & Traffic Association met on Wednesday at 2.30 p. m. in a joint session with the Accountants' Association to consider committee reports on the cost of rush-hour service, fares and transfers, and express and freight traffic, and also to discuss prepayment systems and to listen to an address by Prof. Clyde L. King, Wharton School of Commerce, University of Pennsylvania, on "Some National Issues in Local Street Railway Franchises." The report of the committee on rush-hour service was read by J. V. Sullivan, Chicago Surface Lines, chairman; the one on fares and transfers by J. T. Moffett, Washington (D. C.) Railway & Electric Company, and the one on express and freight traffic by F. D. Norviel, Union Traction Company of Indiana, chairman.



## COST OF RUSH-HOUR SERVICE

The report of the committee on the cost of rush-hour service was more in the nature of a progress report, not aiming to give definite conclusions as to the best method of proving such cost. The committee suggested to member companies (except those having elevated or subway lines) a tentative method of computing rush-hour cost, but the three reporting companies whose data forms the greater part of the committee's report deviated more or less from the suggested method, and the result was a varying ratio between rush and non-rush-hour cost. The committee presented in detail the data submitted by each company, with description of the methods of computation used, and also distribution data regarding fixed and variable expenses from the publication of the Bureau of Fare Research on "The Cost of Urban Transportation Service." One of the most interesting exhibits presented by one company, the committee stated, was in the form of a diagram showing the revenue, cost and net income per passenger for a



typical week day. The accompanying reproduction of this shows a deficit in hours for the periods from 12-1, 1-2, 2-5, 8-9, 9-10, 5-6, 6-7 and 11-12.

In the opinion of the committee the general adoption of a plan of "day-light saving" probably would not assist materially in lowering the cost of rush-hour service, but its application in separate factories and stores here and there would doubtless be helpful. In conclusion, the committee stated that it is apparent to railroad men that any increase in business can decrease the cost of production only when the increase is distributed so as to make possible a more efficient use of existing equipment. Whenever that increase is concentrated so as to require more equipment, the cost of production per unit of service is increased, and consequently the cost of peak-load service is higher than that of normal service. A rate schedule, to be equitable to all consumers of a public utility, should make persons who need and create the peak-load service pay a price which will be commensurate with the extra cost of the service they

are receiving. That principle is nearly always recognized in the making of electric lighting and power rates, but it has rarely been observed in rate making for electric railways. If it is not possible, however, for a street railway to charge a higher rate during rush hours, it does seem reasonable that the company be allowed to charge the same rate of fare as during the non-rush hours, rather than a decreased rate, as is done by workmen's and other forms of tickets which are good only during rush hours. Similarly, the objection holds good that the return on investment should not be further impaired by requiring the use of more cars during the peak hours where service is already highly concentrated.

The committee recommended that the study be continued next year by a larger committee, having representatives from the Transportation & Traffic, the Engineering and the Accountants' Associations; that the member companies assist more actively in furnishing the information requested; that future studies of the problem include a separate investigation of rush-hour costs on subway and elevated lines, and that the American Association be urged to assist in promoting an appreciation by large industrial establishments of the acuteness of the rush-hour problem and the possibilities of improving rush-hour conditions by adjusting the opening and closing hours for work.

The report was signed by J. V. Sullivan, chairman; A. T. Warner and H. B. Potter.

## DISCUSSION ON RUSH-HOUR COSTS

In opening the discussion of this report, Edward Dana, Boston Elevated Railway, stated that the committee had taken a long step forward in the analysis of the cost of rush-hour service. In his opinion, until the companies could explain the facts of this matter fully to public service commissions, they could not expect the commissions to view with as much seriousness as they themselves the question of adding service during the rush hours. A. T. Warner, Public Service Railway, Newark, N. J., mentioned the past studies made by his company along this line and said that if the work were to be done now, the railway would have to consider charging a large part of the cost of the new terminal to rush-hour service, for if it had not been for the rush-hour problem the terminal would not have been built for some years to come.

Prof. A. S. Richey, Worcester Polytechnic Institute, noted that public service commissions had generally recognized that electric lighting and power rates should be higher for rush-hour service than during the off-peak hours, but that in the case of street railways no recognition of a higher rush-hour cost was given except through telling the passengers not to expect non-rush-hour service in rush hours. In some localities, it is true, rates had been made lower during the rush hours either through workman's tickets or through a general fare reduction, but in a general fashion this was known to be a mistake, and the association was doing well to try to provide a method of proving the fact. Whatever variation there might be in the results secured by different methods of computing rush-hour costs, owing to the differences of individual judgments in their application, they would all show that service costs at least as much in rush hours as in non-rush hours, and that the companies ought to be relieved of lower fares in rush-hours.

According to Mr. Warner, he had found in his investigations that while the passenger traffic was much greater in rush hours the amount of service demanded was also much greater. In other words, the number of transfers and the average length of ride per passenger



were greater in rush hours. In one case a ratio of 31 per cent for transfers to passengers in the middle of the day was changed to 40 per cent between 5 p. m. and 6 p. m., and the average length of ride per passenger was 14.8 per cent greater during this hour than in the middle of the day. Mr. Sullivan suggested the advisability of further study of rush-hour service being handled by a joint committee of the Engineering Association, the Transportation & Traffic Association and the Accountants' Association, and the report was accepted and this recommendation referred to the executive committees.

#### FARES AND TRANSFERS

The report of this committee contains a digest of the reports of previous committees on the same subject. A part of its report is devoted to statistics showing the percentage of transfers issued to revenue passengers carried on the 122 roads replying to the data sheet. The highest percentage shown is 74, and only nine lines report that they do not have free interchange of passengers at some point on their lines. Of 103 roads answering the question in regard to the delivery of transfers from the printers, twenty-seven have the transfers delivered to the general manager or superintendent, thirty-one to the accounting or auditing department, twenty-four to the storekeeper, ten to the general office, ten to the ticket or purchasing agent, and one road prints its own transfers. On sixty-three out of 113 roads the conductor punches the month, day, time and destination. On the other lines one or more of these designations is printed, punched by a clerk, designated by colors, or not shown at all. Transfers collected by conductors are turned in at the end of the day on seventy-seven roads, at the end of each trip on twenty-five roads, and at the end of each half trip on eleven roads. Other statistics of the use of transfers and the practice of the different companies are presented in the report.

While it is impossible to eliminate entirely the use of paper transfers, the committee recommends where possible the establishment of inclosed areas at large transfer points so as to obtain bodily transfer, because just as long as transfers are delivered to conductors for issue there will be some abuse of the privilege. For the collection of fares at such prepayment areas, the committee strongly recommends wherever possible the elimination of tickets and the collection of fares by means of a motor-driven fare box. While this device requires change makers, their number does not equal the number who would be required to sell tickets, and passengers are said quickly to acquire the habit of having the exact fare ready.

In conclusion, the committee recommends the appointment of a special committee to sit with a joint committee of the Accountants' Association on the whole question of transfers, that member companies give their support and encouragement to manufacturers in their effort to perfect a transfer-issuing machine, and that where transfers are issued they be printed where possible with day, date, month and year, and that the same color be not issued on consecutive days.

The report is signed by C. S. Ching, chairman; G. L. Radcliffe, Bruce Cameron, J. T. Moffett and B. C. Edgar.

#### OPINIONS ABOUT FARES AND TRANSFERS

Mr. Sullivan thought the transfer question was one which deserved thorough study. As a point in favor of a company printing its own transfers, he mentioned the possibility of a leak in the outside printing office. One company had to destroy 1,000,000 transfers because

duplicate numbers had been run off by the printers and put in circulation. In another case it was found that transfers were swept up from the floor of the printing establishment and used. In regard to using transfers on which the month and day must be punched, instead of transfers printed for each day, Mr. Sullivan said that that use of the former transfers would reduce the cost of printing on account of no large excess being needed for each day, but that companies would probably admit the greater risk involved in using transfers valid for any day in the year, on account of the temptations for conductors to dispose of them. As to the registration of transfers, Mr. Sullivan stated that where the number in use was not so great as to prohibit the checking up of transfers to compare with the register statements, registration should be used. He said that it was advantageous to have the transfers placed in envelopes at least every round trip, boxes being placed at convenient terminals rather than on the cars. Furthermore, he felt that carelessness in regard to punching transfers was the principal cause of ill-feeling on the part of patrons, but it seemed that no amount of instruction would train every conductor to punch transfers as he should. It behooved a careful superintendent, however, to minimize this evil.

J. E. Duffy, New York State Railways, Syracuse, N. Y., believed that a check of transfers was worthy of consideration, inasmuch as it might show where re-routing might help riders. As for a transfer-issuing machine, if it could be made to occupy a small space, print legibly and reduce transfer costs to a minimum, there would be a good field for such a machine. He thought that the printing of the day, date, month and year on the transfers would be advisable for large companies, but that the waste might be prohibitive for small companies. He admitted, however, such transfers would probably give better satisfaction that no fraud was being committed. In regard to a joint committee with accountants for considering the questions of fares and transfers, Mr. Duffy thought that the executives of the companies should be the only ones to consider the question of transfer costs and the accountants should only follow orders and provide the transfer system desired.

W. F. Ham, Washington Railway & Electric Company, averred that it was just as proper for the accountants to make recommendations in regard to the proper spending of money along transfer and other lines as it was for the transportation officials to do so. The members of the accounting department would always follow instructions, but it would be wise to co-operate with them to find out whether any good was being accomplished by such instructions. To Mr. Ham's mind the question of the proper issuance of transfers was fundamental, and he asked whether it was reasonable, practicable or desirable to hold conductors strictly to a correct punching of transfers. Operating conditions, he said, made it difficult for conductors to punch transfers correctly at times, and unless the act was performed correctly there would be very little advantage in checking the transfers and trying to hold the conductors to rules.

J. F. Ohmer, Ohmer Fare Register Company, stated that the advantage of a transfer printed by a machine on the spot over one previously printed and punched was obvious, and that the saving to the conductor through the former transfers was also obvious. Manufacturers were trying to produce machines that would meet all requirements, but it was necessary that the requirements be brought to their notice. For this reason he asked that the transfer machines on exhibition at the convention be carefully examined and criticized.



The report of the committee was thereupon accepted as rendered.

#### DISCUSSION ON PREPAYMENT SYSTEMS

The discussion on prepayment systems was opened by J. W. Brown, Public Service Railway, Newark, N. J., who, after describing the origin of the prepayment system, stated that the orderly movement of passengers and the business-like collection of fares under this system constituted a great improvement over the results of the old method. The prepayment principle on city lines was an undoubted success. Experience had indicated an increase in gross of from 5 to 12 per cent, and the public generally agreed that the plan was meritorious. Mr. Brown also spoke in favor of the use of fare boxes on prepayment cars. J. E. Gibson, Kansas City Railways, presented a historical review of the development of prepayment operation in Kansas City and stated that the plan was satisfactory to the public and the employees. He also described the success of front end collection in Kansas City as regards time saving in loading. He thought that the prepayment idea could be further developed along the line of perfecting a system of registration for all classes of fares.

A. Gaboury, Montreal Tramways, stated that the first modern pay-as-you-enter car was put in service in Montreal in 1904 on the St. Catherine Street route. In his opinion, if the company should to-day wish to return to the old system of the conductor going through the car, it would not be permitted to do so. After experimenting with long platforms, some as long as 9 ft., his company had found the ordinary platform quite suitable for all ordinary requirements, and had suffered delay through congestion only in exceptional cases, such as at ball games or at extraordinary places where large crowds had to be handled at once. It was interesting to note, however, that the large loading platform was again being brought forward in some cities, notably Cleveland, where the whole front half of the car was being used as a loading platform to speed up the car.

According to Mr. Gaboury, experience had shown that the benefits derived from pay-as-you-enter cars were far-reaching both to the companies and to the traveling public. They had done much toward eliminating missed fares, facilitated loading, helped to speed up the service, contributed to the comfort of patrons and created a revolution in the prevention of accidents. As to the elimination of lost fares, the increase in earnings when these cars were put on the road was marked and is on record, not to be disputed. Some improvements had been made since the first cars came out and others would doubtless be thought of, one of which would be to narrow the passage past the conductor, so that only one person could pass at a time, and rushing the conductor would be prevented. Mr. Gaboury had prepared sets of photographs, showing the evolution of pay-as-you-enter cars in Montreal.

N. H. Brown, International Railway, Buffalo, N. Y., firmly believed that the adoption of the prepayment idea ranked with the adoption of electrical energy for car operation. Revenue thereby had been increased 10 per cent through the elimination of fare dodgers, the avoidance of skipped fares in crowded cars and the control of dishonest employees. He believed that the system was the best one in use at present, although some time there would probably be developed a scheme for paying fares and receiving transfers before entrance to the cars in order to expedite traffic. In reply to a query as to the relative efficiency of center-entrance cars and rear-entrance cars, A. H. Woodward, International Register Company, stated that in Los Angeles seventy-five coin boxes had been placed in center-entrance cars, but

that owing to the loss of fares through the arrangement of exit railings no gain was shown over end-entrance cars. The railings had been changed and the loss avoided, but there had been no time since to make a check as to the relative efficiency of the two types.

#### EXPRESS AND FREIGHT TRAFFIC

The committee on express and freight traffic subdivided its work between two sub-committees, to one of which was assigned the study of contracts with old-line express companies, the subject for the other being "Handling of Freight."

The first sub-committee was to endeavor to ascertain which style of contract is the most favorable from a revenue standpoint from old-line express companies: "A tonnage basis," "a mileage basis," or "a prorate of the rates," and to secure a form of contract which the committee may recommend for the use of traction lines in executing traffic agreements with the old-line express companies.

In reply to queries from the committee it was learned from twenty-six companies that of these all but one have contracts with one or more old-line express companies. Fifteen have contracts with Wells, Fargo & Company, six with the American Express Company, five with the Adams Express Company and one with the Dominion Express Company. One company has contracts with two old-line express companies and one company has contracts with three old-line express companies. Of these companies sixteen have entered into contracts on a rate prorate basis, eight on a tonnage basis and one company provides service, for which it receives a certain stipulated amount each month. Twenty of the companies have entered into exclusive contracts, that is, contracts which prevent doing business with any other express company than the one contracted with. Five have non-exclusive contracts. In addition to carrying old-line express, seventeen of the member companies handle local express on passenger trains, receiving for this service a higher compensation than that provided by the regular freight rates. The term local express here used refers to that class of service which provides for the carrying of certain commodities covered by classification on regular passenger cars. In other words, it is non-pickup or delivery express service. Nine companies do not render service of this class. In general, it is the practice of the electric railways to handle old-line express on regular passenger cars, which are provided with baggage compartments. A number of the member companies are obliged, on account of the large volume of business offered by the express companies, to furnish one or more trains a day for their exclusive use.

From data received and tabulated by the committee it was learned that in practically all cases the rate prorate basis of settlement produces the best financial returns to the contracting electric carrier. This is due to the fact that the minimum short-haul charge used in the basis of rate making is in favor of the short line. To illustrate this point, in one case the local rate for carrying 100 lb. 99 miles is 75 cents and for carrying 100 lb. 25 miles is 40 cents and 100 lb. 20 miles is 40 cents, and for carrying 100 lb. 150 miles is \$1. This shows a variation from 2 cents per mile per 100 lb. to two-thirds of 1 cent per mile per 100 lb.

With respect to the compensation received by the carriers, there is a considerable range. Seven companies furnishing data receive 50 per cent, five companies receive 45 per cent, one company receives 40 per cent and one company 15 per cent of the gross revenue accruing to the express company from the carrying of express over the electric company's lines.



There is no established practice as to the furnishing of terminal facilities by the electric companies for the express companies. In some of the contracts these facilities are provided for without extra compensation to the electric company and in other cases the electric company furnishes these facilities, receiving therefor stipulated rentals. The same is true with respect to furnishing of extra equipment for the exclusive use of the express company and with respect to furnishing the services of trainmen to look after the handling of express on the passenger trains, when same is not accompanied by express messengers.

It is the general practice of the express companies to employ as their agents, in small towns, the agents of the electric companies. Such services are usually paid for upon the basis of 10 per cent of the business originating at or delivered to the point at which the agent is so employed. It must be borne in mind that in order to ascertain which style of contract is most favorable to the electric railway companies, a thorough study of local conditions must be made. If the member company's mileage is sufficiently long so that it may expect, by reason of such mileage, to secure a proper proportion of the gross operating revenues, by reason of the handling of express over its line as either originating or intermediate carrier it might safely enter into a contract on mileage basis. It was the opinion of the committee that the average electric railway will fare better by rate prorate style of contract.

A recommended form of contract was included with the report.

On the subject of handling freight some valuable data were collected by the sub-committee. These show that about 95 per cent of the lines replying are handling freight locally and a majority of them also handle interline business. The use of trail cars is also becoming more general, supplementing the motor freight car, or being operated in trains with electric locomotives. Where the volume of tonnage will justify this mode of operation, it materially reduces the cost per ton. A large number of the lines have adopted the steam line scale of freight rates, while a few carry individual scales to meet local conditions. About half the lines interchange carload and less than carload business with their interurban and steam line connections on the basis of through rates with audit office settlements; a number interchange on the basis of sums of locals, or proportional rates, and a few have different methods with different connections.

Eleven lines report an increase and ten a decrease in tonnage for the year 1915. The report of gross revenue shows an increase for fourteen lines and a decrease for twenty-one, while twenty lines show an increase in freight revenue as compared with a decrease on seventeen. With the conditions existing in 1915, this showing would seem to demonstrate the fact that the freight business of interurban lines has not yet reached the fullest development, but may be still further expanded, furnishing another source of income without an excessive increase in operating expenses.

Nine lines report additional traffic arrangements with steam lines consummated during the year 1915, which shows a tendency toward the elimination of the barrier between steam and interurban railways.

A further investigation of the freight situation developed a new phase which threatens to be a very perplexing question in future freight rates. Prior to the Cummins amendment of the act to regulate commerce, railroads carried what has commonly become known as "released rates"; however, with the above amendment in lieu of "released rates" the act as it now stands permits the use of graded rates—to cover "different

valuation" increased bulk with no increase in weight, and like conditions on like or analogous articles. This principle seems to be fully recognized in recent decisions. While a classification covering rates based on this plan would entail a vast amount of labor and expense, it is undoubtedly the only intelligent way of making rates on a parallel with valuation and liability. This plan, in the last official classification, has been recognized, especially in the handling of household goods and of livestock. And while it seems that the commission on one hand, and the railroads on the other, have a fair understanding as to the end to be arrived at, they have as yet apparently been unable to arrive at a common ground (except in a few instances, i.e., baggage, household goods, and livestock) in the application of this principle.

The question has been before the courts, and in recent decisions the courts have been inclined to interpret the act favorable to and recognizing graded rates. In other words, if any freight, regardless of its liability of damage or its valuation, is accepted for transportation by a carrier, that carrier is liable for any loss or damage up to the full invoiced value of such article, its only relief being in some form of a graded rate adequate to cover increased or excessive carrier insurance.

The question of graded rates for handling baggage, covering weight value and bulk, has been established for about eighteen months, being in force by practically all steam carriers throughout the United States, and very largely used by electric lines, especially in the Central States.

There has been a vast amount of work investigating the question of livestock, which now seems to be fairly well settled by Case No. 6825 (40 I. C. C. 347-357), National Society of Record Associations et al. vs. Aberdeen & Rockfish Railroad et al., submitted May 24, 1915. Opinion No. 3816. This decision practically places equivaluation and carrying charges on such commodities in western, southern and official classification territories with the same graded increase for value in "rates on higher values to go up only 2 per cent on 50 per cent increase in value."

This report was signed by F. D. Norviel, chairman, H. J. Clark, W. S. Whitney, W. J. Whiteside, A. R. Piper and C. J. Munton.

#### DISCUSSION OF EXPRESS AND FREIGHT TRAFFIC

In discussing this report, J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, was of the opinion that companies in the future would have to look to freight for an increase in revenues. He mentioned varying opinions as to whether electric railway freight rates should be higher than corresponding steam railroad rates, but said that there were indications in commission opinions and other sources that electric railways should meet the steam railroad rates. E. H. Hyman, Cleveland Railway, stated that it was a serious thing for any electric railway to enter into an agreement with an express company for the handling of purely local business, although a contract might be all right from points on the electric line to points beyond and vice versa. As regards the compensation to electric railways, he believed that a tonnage basis had an advantage over a pro-rata basis, inasmuch as under it all the money earned by the electric line could be secured within thirty days and the traffic could be checked. The report was accepted and ordered filed.

The last item on the program was the paper by Professor King, which is abstracted elsewhere in this issue. After its submission a rising vote of thanks was voted to him and the joint session was declared ended.



## Thursday's Session

The session of the Transportation & Traffic Association, held on Thursday afternoon, was opened by the presentation of the report of the committee on rules. Owing to the absence of the chairman of this committee, C. E. Morgan, Michigan Railway, Jackson, Mich., the report was presented by J. E. Duffy, New York State Railways, Syracuse, N. Y., a member of the committee. The report was adopted by the association without discussion.

### COMMITTEE ON RULES

The committee on rules presented a progress report in which it was recommended that the subject of signal rules be given further consideration by the incoming committee. The committee expressed the opinion that the existing standard rules are sufficient to cover the operation of trains of two or more cars, since it has been found that practically all member companies are using standard signals, although they are employing different mechanical methods for communicating such signals to the motormen.

The report stated that two questions involving interpretation of rules had been submitted to the committee during the year, and that action had been taken upon these prior to references to the executive committee for its approval. The report was signed by C. E. Morgan, chairman; Samuel Riddle, J. E. Duffy, M. S. Sloan, U. W. Berry, F. M. Hill and S. W. Greenland.

### COMPANY PUBLICATIONS

Following the presentation of this report there was a symposium on company publications in the form of written papers by F. W. Hild, general manager Denver Tramway Company; T. S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va.; Leake Carraway, director of publicity Southern Public Utilities Company, Charlotte, N. C., and James H. Braden, general agent Northern Ohio Traction & Light Company, Akron, Ohio. In addition Mr. Hild read a suggestion on standardization of company publications prepared by Mr. Davis, editor of the *Tramway Bulletin*, which is published by the Denver Tramway Company.

An abstract of these papers appears elsewhere in this issue.

The discussion on company publications was opened by A. D. B. Van Zandt, Detroit United Railway, who said that the publicity man is not one to suppress news and that publicity is not to be started in days of war. Preparedness is necessary in this field and the department of publicity should be as well organized as other departments, so that it can anticipate the pulse of the public. The association should assist in the organization of publicity departments as in other branches of the electric railway field. The man responsible for publicity work should not lay down rules which are too rigid as to material and size of publications and publicity work should have a wide range. He should be a trained newspaper man who has learned electric railway work or vice versa. In Detroit, the public seems to look upon the company publication, *Electric Railway Service*, as if it were independently published. Mr. Van Zandt thought that no company should refrain from the publication of periodicals on account of the cost, and that the company would be justified in carrying appropriate advertising if necessary.

H. A. Bullock, Brooklyn Rapid Transit System, said that in approaching this subject it was important to

have in mind the principles outlined by Mr. Lee in his American Association paper. The principles must be sound, as no amount of attractiveness in appearance of material will take the place of such soundness. Publicity material should be divided into two parts, that which is suitable for publication in a company organ and that which should be published elsewhere. Newspaper advertisements, car cards, etc., have their place. When dry facts have to be presented lucidly, display type in newspapers is valuable.

Regarding company publications Mr. Bullock said that there are two radical divisions of these, those for distribution on cars and those for employees. It has been questioned whether the periodical is the best medium, or whether irregular although possibly frequently issued circulars on special topics are best. Conditions differ in different communities, and each situation demands a careful analysis to determine the most effective ways. Irregular publication might be best for a metropolitan district where ground is raked carefully by the newspapers.

Mr. Bullock did not agree with Mr. Wheelwright in believing that controversial questions should be avoided in these publications. Ambitious politicians are apt to pre-empt newspapers and it is difficult for a corporation to get facts before the public through ordinary channels. Special bulletins afford an opportunity to tell the facts. When a bulletin is not needed for special questions it can discuss safety, welfare, insurance, suggestions regarding co-operation, etc. The *Brooklyn Rapid Transit Monthly* is made up of several parts. The covers carry an attractive design and bulletins, there is an editorial by the president and feature articles or write-ups. The balance is filled with news of departments, safety, benefit fund data, etc. Twenty-five thousand copies are printed.

G. T. Seely, Metropolitan West Side Elevated Railroad, Chicago, stated that his company has two publications, one for employees and one for the public. These are used partly for publishing commendatory letters and the effects upon the employees are excellent. A newspaper man is engaged to prepare material for these papers which are each of about eight pages.

Mr. Carraway moved that the executive committee consider the matter of company publications with a view to encouraging a co-operative spirit, and the motion was passed. After votes of thanks for these papers and resolutions of appreciation for the efforts which had been made to render the convention a success, the following were elected on nomination by the nominating committee:

President, L. C. Bradley, assistant district manager Stone & Webster Companies, Houston, Tex.

First vice-president, W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Second vice-president, R. P. Stebens, president Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Third vice-president, L. H. Palmer, acting general manager Eastern Pennsylvania Railways, Pottsville, Pa.

Executive committee: R. B. Stearns, vice-president Milwaukee Electric Railway & Light Company; H. C. Donecker, assistant general manager Public Service Railway, Newark, N. J.; J. J. Dempsey, superintendent elevated transportation Brooklyn Rapid Transit System, and H. B. Potter, assistant to vice-president Boston Elevated Railway.

After the president-elect had been escorted to the chair by L. H. Palmer and R. P. Stevens, he accepted the responsibilities of his office, stated the closing convention was the best in the history of the association and declared the meeting adjourned.



## The 1916-1917 Association Presidents

**L**UCIUS S. STORRS, last year first vice-president of the American Association, was elected its president at the Atlantic City meeting. He was similarly promoted from the vice-presidency of the Connecticut Company, New Haven, Conn., to the presidency of that company in December, 1913, the position which he now holds.

Mr. Storrs takes up the presidency of the Association at the age of forty-seven years, after long experience in the work of the Association and of the industry which it represents. He is an alumnus of the University of Nebraska, class of 1890, and while in college followed a scientific course. He is entitled to append the letters "A.M." to his name should he care to do so. For about seven years after graduation he was on the staff of the Colorado Fuel & Iron Company with the title of geologist, leaving this company for a position with the Northern Pacific Railroad.

Mr. Storrs' occupancy of his present position is the direct and logical outcome of the step which he took in 1906, in entering the organization of the New York, New Haven & Hartford Railroad, as he was made vice-president of the New England Investment & Security Company, a New Haven subsidiary, with headquarters in Boston, the following year. Soon thereafter he became president of the company. In 1908 he established headquarters in Springfield, Mass., having charge of the administration of a number of electric railway properties, with particular interest in the development in the central Massachusetts territory of both passenger and express service and the co-ordination of several systems into an organization of improved earning power and efficiency. In June, 1911, he was elected vice-president of the Connecticut Company and of the New York, New Haven & Hartford Railroad the following year. In December, 1913, he became president of the Connecticut Company.

Mr. Storrs is a member of numerous scientific and professional organizations, including the Sigma Xi Society and the American Institute of Mining Engineers.

**M**ATHEW R. BOYLAN, the newly-elected president of the Accountants' Association, has served on many important committees of the Association. He was its first vice-president in 1910, and since 1912 has been its secretary-treasurer. His promotion to the presidency is in accordance with the plan suggested by President Kilfoyle, of putting into the responsible positions

those whose work has most thoroughly familiarized them with the details of the Association's problems.

Mr. Boylan is at present general auditor Public Service Railway, Newark, N. J. For twenty-four years he has been continuously connected with the New Jersey railways. He began his work as stenographer and clerk in the office of C. B. Thurston, president Jersey City & Bergen Railroad when it was a horse-car line. After the road was electrified he served in the transportation department, the shops and the power generating stations of the company. In 1899 Mr. Boylan entered the general auditors' department of the Con-

solidated Traction Company, which had absorbed the Jersey City & Bergen Company and was leased to the North Jersey Street Railway. He served as voucher clerk, bookkeeper, chief clerk and assistant auditor in this department. The North Jersey Street Railway was acquired by the Public Service Railway in 1903, and since 1904 Mr. Boylan has been the general auditor of the latter company, with headquarters at Newark, N. J.



L. S. STORRS



F. R. PHILLIPS



M. R. BOYLAN



THOMAS FINIGAN

*Portraits of the other presidents, R. E. McDougall and L. C. Bradley, appear elsewhere in this issue*

**F**RANK R. PHILLIPS, the new president of the Engineering Association, is one of the pioneers in the design of light-weight cars and equipment, and has developed numerous labor-saving devices in repair-shop equipment. He is superintendent of equipment of the Pittsburgh Railways, having taken this position on Jan. 1, 1910.

Mr. Phillips was born in Cleveland, Ohio, Oct. 29, 1876, and obtained his early railway experience in that city. He was first employed by the Cleve-

land City Railway in 1894 as clerk in the transportation department, and later served successively as rodman in the way department, switchboard operator, boiler fireman, shop electrician, mechanical draftsman and inspector, and general foreman of shops. While engaged in this work he took up the study of mechanical engineering by private instruction, attending lectures at night. In addition to the general apprenticeship mentioned, Mr. Phillips has held the positions of master mechanic of the South Covington & Cincinnati Street Railway, chief engineer of the Michigan United Railways and engineer in charge of railway work for the Ohio Brass Company.

In connection with his work Mr. Phillips is an advocate of the co-operative system of training for engineering students as promulgated by Dean Herman Schneider of the University of Cincinnati. He believes with Dean Schneider that the application of theory to practical



uses during college training tends better to fit the student for life work at the time of graduation. His particular hobbies are production efficiency and the development of uses for waste materials. He has served as member of a number of association committees and as chairman of the committee on equipment for several years. He is most particularly interested in the work of the committee on standards.

**R.** E. McDUGALL, the newly-elected president of the Claims Association, has been its acting president since the mid-year meeting of the Association held in Chicago, Ill., on Feb. 4, 1916. At that time the executive committee elected him to fill the position left vacant by George C. Carson, claim agent Puget Sound Traction, Light & Power Company who, having severed his connections with the company, was no longer eligible.

Mr. MacDougall has been prominently connected with the association for several years and has been on important committees. He served as vice-president from 1913 until he was made acting president last winter. Prior to his work in the railway industry, Mr. MacDougall was a lawyer with Kernan & Kernan, attorneys, Utica, N. Y. He severed his connection with this law firm to become claim agent for the Utica & Mohawk Railroad and the Oneida Railway. After several years' service with these lines, he went to Rochester to take the position of claim agent of the New York State Railways, Rochester Lines, with which he has been associated for about four years. He is a member of the Rochester Club, the Oak Hill Country Club, the Rotary Club of Rochester and the Rochester Chamber of Commerce. A portrait of Mr. MacDougall will be found elsewhere in this issue.

**L**UKE C. BRADLEY, the new president of the Transportation & Traffic Association, is an engineer of wide experience secured on properties scattered

widely throughout the United States. This has come about through his association with Stone & Webster and J. G. White & Company particularly. In the several cities where he has resided he has taken an active part in civic affairs.

The important positions which Mr. Bradley has occupied before his present one are: General superintendent Puget Sound Electric Railway, Seattle, Wash.; general manager Key West Mining & Railway Company, Salt Lake City, Utah; general superintendent Tennessee Northern Railway, Knoxville, Tenn.; general manager Scioto Valley Traction Company, Columbus, Ohio; general manager of the J. G. White railway, lighting and gas properties at Pottsville, Pa.; manager Galveston (Tex.) Electric Company, and vice-president Houston (Tex.) Electric Company and Galveston-Houston Electric Railway. Since 1913 he has been assistant district manager Stone & Webster Companies, Texas District, with headquarters at Dallas. In this position he has control over the street railways and other corporations in Galveston, Dallas, Fort Worth, Beaumont, Port Arthur, Houston and El Paso, and several inter-urban railways.

**T**HOMAS FINIGAN, manager sales department American Brakeshoe & Foundry Company, San Francisco, Cal., who was re-elected president of the Manufacturers' Association, was formerly in railway operating work, having entered the employ of the Consolidated Traction Company, Newark, N. J., in 1898. He soon became assistant master mechanic, and in 1903 entered the mechanical department of the United Railroads of San Francisco. He became purchasing agent for the same company in 1907 but resigned in 1913 to enter commercial work.

A biographical sketch of Mr. Finigan was published in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 9, 1915, page 786.

## Manufacturers' Association Activities

After an Analysis of the Situation by a Committee and Discussion by the Manufacturers' Association at Atlantic City, It Was Decided to Continue This Association for the Present

**M**ORE than 100 members of the American Electric Railway Manufacturers' Association attended the annual meeting held on Oct. 11 in the Park Avenue Hall of the Marlborough-Blenheim Hotel at Atlantic City. At this meeting a committee report of great interest was favorably considered and adopted, routine business was transacted, new officers were elected, and the manufacturers listened to a talk by Charles L. Henry, president of the American Electric Railway Association. Thomas Finigan, president of the Manufacturers' Association, presided.

After routine business had been transacted, President Finigan spoke of the events that had transpired since the San Francisco convention. At the San Francisco convention C. Loomis Allen, the then retiring president of the American Electric Railway Association, in his annual address had stated that the condition of the industry made it necessary to have the closest co-operation of all in order to obtain the best results. He further stated that the status of the Manufacturers' Association precluded the possibility of obtaining the necessary co-operation, and he recommended that manufacturers be admitted as members of the parent association on the same basis as railway company members.

Mr. Allen's successor, President Henry, in accord

with this suggestion, Mr. Finigan said, appointed a committee to formulate plans for obtaining the desired results. This committee was unable to formulate any definite plans, but at the mid-winter meeting in Chicago the constitution and by-laws of the American Electric Railway Association were so modified that manufacturers, as companies and individuals, could become members of the parent association. At that time Mr. Henry agreed with members of the executive committee of the Manufacturers' Association on a plan for jointly carrying on the work of the 1916 convention. Later, the parent association stated that it would undertake this work itself.

Mr. Finigan further stated that as this took out of the jurisdiction of the Manufacturers' Association the functions ordinarily performed by that association, the Manufacturers' Association for the first time in its history was deprived of the privilege of participating in the activities of the 1916 convention as an association, and the question then arose as to whether or not there was any necessity for continuing the Manufacturers' Association in its present form. After a full and free discussion of this subject at a meeting of the manufacturers' executive committee in New York on March 8, it was the sense of the members present, Mr. Finigan



said, that perhaps there was a work, aside from looking after the exhibits and entertainments at the convention, which this association could perform to promote the welfare of the electric railway industry, and that President Finigan, by resolution, had been authorized to appoint a committee of four to consider this phase of the situation and to report at the Atlantic City meeting. This committee accordingly had been appointed. It consisted of Messrs. B. A. Hegeman, Jr., chairman; James H. McGraw, M. B. Lambert and W. F. Cutler.

President Finigan told the manufacturers that Mr. Hegeman's committee had reported to the Manufacturers' Association executive committee and that it was the sense of the executive committee that the report be submitted to the annual meeting of the association with the recommendation that it be adopted. President Finigan then called upon Mr. Hegeman to present the report of the committee.

#### REPORT ON CONTINUING MANUFACTURERS' ASSOCIATION

Before reading the report Mr. Hegeman stated that at the meetings of the committee when the report was being formulated the committee members had industriously studied the question of just what the manufacturers could do to render service of greatest value to the American Electric Railway Association and likewise to the manufacturing companies. The subject had been approached with the spirit of good feeling, and, in accordance with the original resolution, Mr. Hegeman had consulted with the president of the Railway Business Association to learn whether its functions as performed for the steam railroads might similarly be performed by the Manufacturers' Association for the electric railways. It was thought, however, that because of the differences in the character of the steam and electric railways, one being interstate and the other largely local, that it would be impossible and impracticable to carry on similar work.

Mr. Hegeman then read the committee's report, an abstract of which follows:

"Your committee, appointed by our president at the meeting of the committee held at the Waldorf-Astoria, New York, March 8, 1916, for the purpose of considering the advisability of continuing the association, and, further, to formulate plans, if possible, looking to the use of our association to promote the interests of the electric railway industry, begs to report as follows:

"At a meeting of the committee held at the Shelburne Hotel Oct. 8, 1916, at which our president and all members of the committee were present excepting Mr. Cutler, and after a full and free discussion of the subject under consideration it was decided as the sense of the committee that the association should continue its existence for another year at least, as it is found the balance now in the association's treasury is sufficient to meet our expenses.

"The reasons that led your committee to recommend the action above outlined were:

"First—This is the first time that manufacturers and sellers of electric railway supplies have not participated as an organization in the activities of the electric railway convention. This is due to the action of the American Electric Railway Association at the meeting in Chicago, February last (1916), when they altered the constitution and by-laws so as to admit to full membership manufacturers as company members with all the rights and standing of railway companies.

"Second—That although manufacturing concerns are now members of the railway association their exact status has not yet been determined and it seems therefore desirable to preserve the organization at least one year."

After the reading of the report the president called upon Messrs. McGraw and Lambert for discussion. Mr. McGraw said that he believed in the principle that was adopted by the American Association at Chicago and that it was proper and fitting for manufacturers to become members of the American Association as they saw fit. He was, however, not in entire accord with the hastiness of the Chicago action. There were problems connected with the plan of the amalgamation in membership that still had to be solved. The manufacturers should be willing to work at these problems until the light appeared. He knew that they would work in the interest of the industry as a whole and in the right spirit. Already 208 manufacturers had joined the American Association.

It seemed desirable to retain the organization of the Manufacturers' Association, however, so that it could continue to voice the sentiment of the manufacturers to the parent association, and so that it could do any other work that might arise. There was reason for congratulation that every manufacturer could be a member of the American Electric Railway Association.

Mr. Lambert said that someone had raised the question as to the need for an independent Manufacturers' Association; why should there be two organizations? This question he answered by stating that there were frequently subjects of common manufacturing interest that were presented for discussion only from the manufacturers' standpoint. The plan of organization of the American Association did not provide the machinery for meetings on subjects purely of manufacturing interest. The report of the committee had been formulated only after discussions with many railway officials, practically all of whom thought it best to continue the Manufacturers' Association.

After short remarks by the president, the Association unanimously adopted the report of Mr. Hegeman's committee, thus determining to continue the American Electric Railway Manufacturers' Association on its present basis.

#### REPORT ON FINANCES

The chair then called upon L. E. Gould, vice-president in charge of finance for a report. Mr. Gould stated that because of the reduced association operating expenses in 1915, since there was no exhibit at San Francisco Convention, the annual dues had been reduced from \$30 a year to \$10 a year, and in 1915, no dues had been collected since the railway association had handled the exhibit and entertainment features. Mr. Gould abstracted the audit of the association books made as of Oct. 1, 1916. This showed that all bills had been paid, and that the Manufacturers' Association had a balance of \$1,679.72.

#### ELECTION

President Finigan announced that the following members automatically retired from the executive committee at that meeting: Messrs. L. J. Drake, F. A. Elmquist, Thomas Farmer, Jr., Bertram Berry and Thomas Finigan. The following nominating committee was then appointed: Messrs. McGraw, Lambert, Wickwire, Estep and Archbold. This committee after deliberation nominated and the association unanimously elected the following new members to the executive committee: Thomas Finigan, American Brake Shoe & Foundry Co., and L. J. Drake, Galena Signal Oil Co., to succeed themselves, and B. A. Hegeman, Jr., U. S. Metal & Mfg. Co., Dwight B. Dean, G. C. Kuhlman Car Co., and Edwin B. Meissner, St. Louis Car Co.

The new executive committee members were installed later in the day and they re-elected Thomas Finigan president and the following vice-presidents: Charles C.



Peirce, Daniel W. Smith, L. E. Gould and E. F. Wickwire. Fred C. Dell was elected secretary and L. E. Gould treasurer.

#### MR. HENRY ADDRESSES MANUFACTURERS

The Manufacturers' Association unanimously voted to request President Henry to address them on subjects of mutual interest. Mr. Henry spoke with much emphasis on the subject of the union of interests between manufacturers and railway men. These interests were now united, he said, in the work for the common good. Mr. Henry thanked the representatives of the manufacturers for the work that they had done for him as president in planning and executing the convention and entertainment details. He spoke of the reasons underlying the Chicago amendments and said that when he retired as president he could carry with him the highest regard for the manufacturers.

When considering how the new manufacturing members of the American Association could best assist in the work Mr. Henry had first thought that some plan might be suggested to the manufacturers as a group, but after continued study he had come to the conclusion that the manufacturers were the ones to decide what to do to complete the amalgamation. He announced, however, that the parent association would at once increase its executive committee membership by the addition of two or three representative manufacturers who would work with the president of the American Association, the four vice-presidents and the presidents of the four affiliated associations towards a final plan for amalgamation. Mr. Henry also said that if the manufacturers thought it desirable to organize an affiliated manufacturers' association, the president of that association, ex-officio, would be a member of the parent association of the executive committee.

## Other Features of the Convention

#### ANNUAL RECEPTION A GAY AFFAIR

The annual reception which from a social standpoint formally opened the convention was held Monday night on the convention pier and was largely attended.

In the receiving line were the officers of the several associations, namely Messrs. Henry, Storrs, Stanley, Kilfoyle, Lindell, Palmer, Nicholl and Burritt, with their ladies.

After the reception, an informal dance was given which lasted until a late hour. The music for the dancing, which was rendered by Caravana's Viennese orchestra under the guidance of Conductor Amorisi, and the tropical Marimba band, was delightful.

#### RED SPECIAL DINNER

Sixty-four of the party which traveled to the San Francisco convention last year on the famous Red Special train, sat down to dinner Thursday evening at the Shelburne grill room. The menu was printed in red; Red Special acquaintances were renewed and Red Special songs were sung. Speeches recalling different experiences of the trip were made by C. L. Henry, C. C. Peirce and C. Loomis Allen. The dinner lasted until about 9 o'clock, when the party adjourned to go to the ball.

#### MARDI GRAS BALL

One of the most enjoyable events in the social calendar was a Mardi Gras ball, given Wednesday night on the convention pier. As the delegates entered, they

were presented with paper hats, and they found the hall decorated with innumerable paper flags and lanterns, characteristic of the carnival spirit. The evening began with dancing, which was continued for half an hour, when an extraordinarily exciting game of polo was put on, the crowd being kept in order by four comedy cops. At the conclusion of the game, which was won by the Reds or Blues, no one knows which, there was a general dance. This was followed by a brief but very amusing skit on the presidential election, the actors being obviously home talent, but hardly distinguishable. After this came an especially graceful and interesting professional act, and then more general dancing, serpentine streamers being thrown from the balconies to make, with the shafts of colored lights thrown upon the floor, a remarkable picture for the onlookers. While the dance was going on, three Italian singers came on the floor and rendered a number of characteristic songs. Subsequently, dancing was continued until after midnight, concluding a most entertaining evening.

#### ANNUAL PROMENADE CONCERT AND BALL

The annual promenade concert and ball, which was the formal event of the week, was well attended and the program, which contained many delightful features which had been arranged by the entertainment committee, was carried out successfully. The festivities began with a grand march led by President Henry and other association officers. There were eighteen dances and numerous encores. The music was furnished by Caravana's Viennese orchestra and Tropical Marimba band. At this affair, as at other affairs earlier in the week, the enjoyment was heightened by specialties introduced between the dances. These specialties were high-class society circus attractions. The first one was a comedy act on the bounding mat. Later there was a special prize dance, in which Mr. and Mrs. Scott Crane figured. And last but not least came roller skating bears.

#### MILITARY BRIDGE PARTY A SUCCESS

The Solarium of the Marlborough-Blenheim presented a festive appearance Tuesday afternoon on the occasion of the military bridge tournament for the ladies, which was scheduled for 2.30 p. m. Altogether there were twenty-two tables and eighty-eight participants, all of whom hoped to win the prizes which had been offered by the entertainment committee. During the game refreshments were provided by the Marlborough-Blenheim. At the close of the contest eight bottles of La Bohème perfume were awarded as prizes to the same number of winners.

#### RESULTS AT THE TRAPS

Henry Lee, vice-president of the Railway Electrical Engineer, won the championship trap shooting contest at the end of the pier Wednesday, by scoring forty-six out of the fifty clay pigeons. Mr. Lee's exhibition was a most excellent one in this contest of one-barrel shooting, and it needed to be, since he was closely followed by L. M. Cargo, district manager of the Westinghouse Electric & Manufacturing Company, who finished second prize winner with forty-five to his credit.

#### INDOOR GOLF FESTIVITIES

During each morning of the week the indoor golf links at the Garden Pier were used by the ladies. These links have nine holes with hazards, tees and all of the other accompaniments of regular links, but are under cover. The course was greatly enjoyed, not only by those who played, but by those who acted as a gallery.



## NEWS OF ELECTRIC RAILWAYS

### SEVEN-CENT FARE UNIT AUTHORIZED

#### New Hampshire Commission Hands Down Decision in Manchester & Nashua Street Railway Case

In a finding dated Oct. 9 the Public Service Commission of New Hampshire authorized the establishment of a 7-cent fare unit by the Manchester & Nashua Street Railway in place of the existing 5-cent unit. The commission suggested the retention of the present fares for school children, together with a commutation ticket on a 5-cent basis in order that workingmen might not suffer hardship by the general increase, although the board pointed out that it did not order the establishment of these reduced rates. The new 7-cent unit took effect on Oct. 16.

The line is divided into three fare limits of about 4 miles each, the middle zone being about 0.5 mile longer than the others and covering the principal residential district of the town of Litchfield. The capitalization of the Manchester & Nashua Company is \$240,000 in common stock and \$200,000 in 5 per cent bonds, the entire proceeds from the sale of the securities being expended in construction. To March 31, 1916, in nine years and three months' operation, the company had paid no dividends on its stock and had made no specific reserve for depreciation, but had accumulated a surplus of \$24,508. In the fiscal year 1915 the operating revenues were \$49,087; operating expenses, \$29,399; net revenue, \$19,688, and bond interest, \$10,000, leaving the net income of the company \$9,688.

As in the Manchester & Derry case recently decided, it was claimed by the company that operating expenses should be increased by much larger expenditures for maintenance, which it was testified should amount to \$500 annually per mile of track. In 1915 this standard would have involved the expenditure of \$6,187 additional on this item, reducing to \$3,501 the net income available for depreciation and dividends. This standard of maintenance is not considered unreasonably high, and the commission points out that if the standard were maintained, the depreciation requirements would be correspondingly reduced. Even with so high a maintenance rate, 1 per cent would not be a large depreciation allowance, and the net income remaining is insufficient to provide even 1 per cent on the investment, wholly apart from making provision for accrued depreciation.

The company has never paid taxes, but next year will come in for taxation, which the commission estimates at not less than \$6,000. It is also entitled to a fair return on its investment, if that can be earned at rates not unreasonable in themselves. A 6 per cent return has been used as the minimum to which the company should be restricted. On the principle laid down in the Manchester Street Railway rate case, this return is to be calculated on the whole investment, whether represented by stock or bonds, the company having been unable through deficiency of income to make adequate provision for depreciation. On a 6 per cent basis the company is entitled to receive \$16,400 in addition to the present return upon its investment, or \$22,400 above present revenue to meet all expenses including taxes, and to pay a 6 per cent return, with a small sum also added though not named, for depreciation reserve.

In addition to all this, the commission points out that the company "is constitutionally entitled to a fair return from the beginning of operation," and that this deficiency of nearly 60 per cent on \$240,000 must be taken into account, either by treating it as a cost of developing the business, and so increasing the amount of the investment upon which the return is to be computed, or by permitting a higher rate of return until the deficiency has been made good. The increase of fares from 5 to 7 cents, on the 1915 traffic, would produce an increase in revenue

of \$18,583, which the commission states is inadequate to provide for depreciation, taxes and a return of 6 per cent on the original investment, taking no account of the deficiency in return from operations hitherto. The commission says: "It is clear that we cannot justly, legally or constitutionally forbid the proposed increase unless the new rates are such as to be clearly unreasonable in themselves, as being more than the service is worth."

The road is occupied almost entirely with interurban service. Its local business is small and it is operating in active competition with the Boston & Maine, rendering a service which in point of speed is hardly inferior and in frequency is greatly superior. The commission states that the track and equipment are good and the service excellent and entirely satisfactory to the patrons of the company.

There is hourly service each way between Manchester and Nashua, increased to half-hourly in July and August afternoons. The trip of about 18 miles from Manchester City Hall to Main Street, Nashua, is made in 55 minutes. The trip between the same points by the Boston & Maine, involving two changes, from electric car to train and from train to trolley, can hardly be made in less time and often requires more. The cost of operation is less on the electric road and the accommodations not so commodious, but the board states that the difference is not such as to warrant any great disparity in rates. For the casual traveler, unless he walks about 0.5 mile in Manchester and nearly a mile in Nashua, the trip by train would cost 52 cents between the same points, or 48 cents by using a mileage book, against 31 cents by the electric road. The board states that "with these comparisons in mind it is impossible to say that the proposed new rates are unreasonable in themselves."

It is held that if school fares were increased, other means of transportation, less expensive and less satisfactory, probably would be provided, putting the townspeople to inconvenience and causing the company to lose such revenue. There is evidence that the running of a jitney bus for the accommodation of workingmen is contemplated, and the cutting off of school and workingmen's patronage would be clear loss to the company, as it would result in no reduction of service or diminution of operating expenses.

The finding states that there is at least grave doubt of the authority of the commission under any circumstances to order the giving of special rates to any special class of patrons where the cost of service is no less than for others, and it is certain that no such power exists where the proposed fares cannot at best produce the revenue to which the company normally would be entitled. It is, however, recommended that the company make no increase in school fares and that it sell commutation tickets, good for one ride in each direction, on every week day, on a 5-cent fare basis.

### PREPARATIONS BEING MADE FOR CONSTRUCTING NEW 130-MILE LINE

The Oklahoma & Northern Traction Company has been incorporated to build an electric railway from Bartlesville east to Miami and thence to Joplin, with a branch from Miami to Columbus, Kan., and another to Baxter Springs, where connection will be made to the lines of the Southwest Missouri Railroad into Joplin. The line will be from 130 to 135 miles in length, and the final locations and surveys are now going on and specifications are being prepared. Mason & Overlees, Bartlesville, Okla., have charge of the local work. W. K. Palmer & Company, consulting engineers, Kansas City, Mo., are in charge of the engineering and business matters connected with the enterprise and are the ones to be addressed on matters connected with the undertaking.



### MAYOR ADDRESSES PHILADELPHIA COUNCIL ON RAPID TRANSIT

Mayor Smith of Philadelphia, Pa., addressed a special session of Councils on Oct. 10, on the transit question in that city. The Mayor, in his address, said in part:

"I sought all the light available to have presented to you a complete and tangible working agreement, which, in turn, could be submitted to the Philadelphia Rapid Transit Company for the equipment and operation of the new lines. With the massive maps and data submitted to me was the draft of the agreement prepared some time in 1914 by the Director of Transit, the parties to which were the city of Philadelphia, the Philadelphia Rapid Transit Company and the Market Street Elevated & Passenger Company.

"I resolved that if the 1914 draft had, in that year, been formulated as a basis of negotiation for the equipment and operation of city-built lines, there was no apparent reason why it should not act in a similar capacity in 1916. I therefore instructed my director to bring the 1914 draft down to date, so as to include the new lines authorized by the 1916 ordinance and omit therefrom all reference to the Camden tube. This the director has done and the revised draft is incorporated in the proposed ordinance hereto attached. I would respectfully urge upon you that public opportunity be given for a full and free discussion of the terms so that the greatest problem facing the citizens and officials of the city may be honestly and equitably solved."

The ordinance introduced at the request of the Mayor provided for the construction by the city of the complete Taylor plan, and for the equipment and operation of this system by the Philadelphia Rapid Transit Company. The ordinance incorporated all the terms of the Taylor plan, including the straight 5-cent fare from any section of the city to any other section in a forward direction and for the abolition of exchange tickets in the various sections of the city on a graduated scale of time. The number of years, however, was left blank in the ordinance.

The conclusion of the ordinance read: "The Mayor is hereby authorized to submit said contract to the Philadelphia Rapid Transit Company, the Union Traction Company and the Market Street Elevated Passenger Railway, and upon their acceptance to execute, acknowledge and deliver the said contract on behalf of the city."

Fewer than one-half the members of Common Council were in their seats when the special session to hear the Mayor's transit message was called, but the clerk declared a quorum present. William M. Lewis, of the Thirty-second Ward, moved to adjourn because the chamber had waited two hours after the time set for the meeting, but his motion was lost. Under the rules, one-half of the membership constitutes a quorum. Thirty-five Councilmen out of eighty-seven were present.

### HUDSON & MANHATTAN RAILROAD ADJUSTS DIFFERENCES WITH EMPLOYEES

The differences that existed between the Hudson & Manhattan Railroads, operating under the Hudson River between New York and New Jersey, and its employees were adjusted on the night of Oct. 4 at a four-hour conference attended by G. W. W. Hanger, commissioner of the United States Board of Mediation & Conciliation; Wilbur C. Fisk, president of the Hudson & Manhattan Railroad Company; G. H. Sims, vice-president of the Brotherhood of Railway Trainmen; L. G. Griffing, third assistant chief of the Brotherhood of Locomotive Engineers; William Clark, of the Order of Railroad Conductors, and representatives of the local unions affiliated with the national brotherhoods. The conference was held in the office of Mr. Fisk in the Hudson Terminal Building. Mr. Fisk issued this statement:

"A most satisfactory conference was had with the representatives of the union. A compromise was reached which seems to appeal to all. The thirty-two discharged employees will be at once reinstated and the Brotherhood of Railroad Trainmen will be recognized by the company. All differences have been amicably settled to the satisfaction of both sides."

### BOSTON ELEVATED APPEAL FOR FINANCIAL RELIEF WELL RECEIVED

The statement of the Boston (Mass.) Elevated Railway, submitted to the special legislative commission on Sept. 25 at Boston in connection with the latter's inquiry into the company's financial condition, has been exceedingly well received by the local dailies. The soundness of the company's case has received editorial recognition. Some of the more significant comments are quoted below in part:

*Boston Herald*: "Judging from the comment in the newspapers, some of which we have reproduced, press and public are convinced that the Boston Elevated Railway must be allowed to charge a little more for its services, either directly to its patrons or indirectly through its relation to public taxation. There never was a time when the public had become so accustomed to increased charges. This was a good time for the company to appeal. When the railroads, not many months ago, changed their mileage books from the 2-cent rate at which they had stood for decades to 2½ cents, there was hardly a ripple of complaint, and yet this was an increase of 12½ per cent in passenger transportation, a change which individual fares also reflected.

"Everybody seems to acknowledge that the Elevated is economically and effectively run—too economically if anything. The public would like less crowding in the cars, but this obviously means a larger scale of expenditures. The wages of operatives are already the result of arbitration in which public authority—and so the voice of the people—has ultimate control. The supposedly high salaries paid to officials, even if unnecessary to retain their services, are but the merest drop in the bucket; and yet the Elevated can get no new money, under the terms which the statute prescribes, for additions and extensions. It is up to the commission now sitting to find a way out. And from the evidence which public discussion affords, the commission will find public sentiment behind them, in some liberalization of existing conditions."

*Boston Advertiser*: "Even if it were honest for the public to expect public service at less than actual cost, it is not to the public's best interests to have it: for in the long run that means poor public service, unsatisfactory facilities. Unless a sufficient margin of profit is allowed, to permit keeping the whole plant in satisfactory shape, the public must suffer with the corporation. . . . The release of the \$500,000 guarantee fund, deposited with the State nearly twenty years ago, is one of these (feasible) suggestions. . . . Then, too, the road is fully justified in asking that the abuse of the transfer privileges be stopped. . . . The purchase of the Cambridge subway by the State and a rental to the company, also, is worth considering. In time the enterprise will be profitable, although it is not so to-day."

*Boston Transcript*: "The company's difficulties were at least clearly and ably stated. It was shown to be up against the stone wall of a great increase in operating costs due to the price of labor and of materials, street railway rentals, subway rentals, taxation, the requirement of additional facilities, and what not. . . . The company is able to make it appear quite clearly that it must be helped out of a situation where it is giving more than it gets. . . . The Boston public, and particularly the Boston suburban public, has rather more privileges of extended travel on a single fare than any other large city."

*Boston Post*: "The Boston Elevated Railway's case, as regards its need of greater revenues in order to make a fair return on investment, is excellently made out. . . . It requires little argument to show that the company needs more revenue than it can get at present under its limitations, some of which have been fixed by law and some of which have been voluntarily assumed. Its expenses—and legitimate ones—have increased much faster than its receipts. . . . It is a well-run road, so that little criticism can come in respect to extravagance. It needs more money and it ought to have it. No other street railway in the country gives so much for a nickel as it does. . . . It is not unreasonable to suppose that out of these suggestions and others that will doubtless be made by men not of the company some measure of relief will be found with justice to all concerned."



## RAILWAY MAIL ON SPACE BASIS

On Nov. 1 the Post-office Department will place practically all the railways in the country on a space basis of pay instead of weight as at present. The only exception will be in the case of the closed pouch business, which will go by weight.

The new method of shipment will include 90 per cent of the postal service. It is understood that the arrangement is experimental and that the Interstate Commerce Commission, whose consent has been obtained for the experiment, will decide after the trial whether the new method should be permanent. Second Assistant Postmaster General Praeger said on Sept. 28:

"The authority which the Interstate Commerce Commission has given to the Postmaster General to place practically the entire railroad mail service on a space basis experimentally will enable the Post-office Department to demonstrate to the commission the fairness of the contention in its long fight before Congress that the space basis is the only practicable, definite, and equitable measure of service in the complex mail transportation problem. Canadian officials have assured us that, after three years' trial, Canada will never change from the space back to the weight basis, and I believe it will be entirely possible to administer the railway mail transportation service of the United States in a manner so just and so practicable from a transportation standpoint that the space basis now authorized experimentally will in the end prove acceptable to the Interstate Commerce Commission and to the railroads."

## ARBITRATION OF CLEVELAND POWER CONTROVERSY DEMANDED

The street railway committee of the City Council of Cleveland, Ohio, having indicated that it will not approve an eighteen-year power contract between the Cleveland Railway and the Cleveland Electric Illuminating Company, the railway has demanded arbitration of the question. At its meeting on Oct. 9 the Council was advised that it would doubtless be necessary to submit the matter to arbitration.

A few days previously, Secretary of War Newton D. Baker, former Mayor of Cleveland, met with the committee and advised that it refuse to approve any contract. J. J. Stanley, president of the Cleveland Railway, said that it would be preposterous for the Illuminating Company to spend \$1,000,000 in preparation for furnishing power without a contract.

Secretary Baker said he would return to Cleveland to aid in the campaign for the approval of the proposed \$1,750,000 bond issue for the municipal light plant by the voters at the November election.

While the proposed contract provides an opportunity for submitting new bids at the end of five years, it requires that if the bid of any competitor be 10 per cent lower than the present proposed figures, the Illuminating Company shall have the option of submitting a new contract, and if its new proposal is as favorable as that submitted by the competitor, the railway shall make a new contract with the power company. Opponents of the plan claim that this will force any other competitor to make a reduction of 10 per cent and virtually result in the retention of the contract by the Illuminating Company for eighteen years.

## FULL SERVICE IN ATLANTA

On the night of Oct. 7, exactly one week after the general riots in downtown Atlanta were fomented by agitators in behalf of the Amalgamated Association against the loyal car crews of the Georgia Railway & Power Company, the company resumed normal schedules on all lines in its system except two. These two, however, were operated normally in daylight.

No open rioting occurred after the morning of Oct. 1, the indignation meeting of citizens with the city police board on the afternoon of that day apparently having impressed the police with the law abiding majority's determination to tolerate no more such disorder. The sole case of disorder reported on Oct. 9 was that of two strikers who manhandled and threatened a conductor. The agitators were arrested.

The fact that normal night schedules were resumed on Sept. 7 was accepted generally as indicating that the at-

tempt to stampede the men had degenerated into a campaign of malicious mischief. Oct. 8 passed almost without incident. Oct. 9, the first of two circus days, with a parade in the forenoon, passed without incident of any kind, save for the one referred to previously.

The citizens' committee, which started meeting at noon each day in the Chamber of Commerce, was visited and addressed on Oct. 4 by representatives of organized labor. The labor men were informed that the sole interest of the committee was the preservation of law and order in the community and that it would not discuss any other question. On Oct. 5 a second attempt was made by local representatives of organized labor to secure interference by the committee between the company and those of its employees who had been disloyal. The general committee intrusted further developments to the executive committee, which conferred on Oct. 6 with representatives of organized labor and adopted on Oct. 7 a resolution not only declaring for the preservation of order, but also recommending a conference between the company and a committee of nine, three of the latter to be striking employees. Without directly answering this, the company addressed a bulletin to its employees, warning them that suggestions of conferences would come from many sources, but assuring them that no matter whence these suggestions emanated the company would not alter its refusal to discuss the agitation with anyone who was responsible for it. Simultaneously the organized labor representatives declared the committee as suggested was not acceptable. They asked to be permitted to name not only three but six members. Thereupon the Superior Court Judge, who had been suggested by the citizen's committee as the proper person to name the committee of nine, declared his purpose to have nothing at all to do with the matter.

**Ontario Hydro Radial Railway Vote.**—On Sept. 28 the Ontario Government passed an order-in-council, at the request of the Ontario Hydroelectric Power Commission, authorizing twenty-five Ontario municipalities to submit by-laws on Jan. 1, 1917, to the ratepayers for the purpose of securing their sanction to the proposed construction of the portion of the Ontario hydro-radial railway system from Port Credit (near Toronto) to Niagara Falls. The road as projected will consist of 100 miles of line. The cost is estimated at approximately \$40,000 per mile.

**Experience Ordinance Eliminated from New City Code.**—The City Council of Indianapolis, Ind., sitting as a committee of the whole to consider an ordinance providing for the revision and codification of city ordinances, struck out a measure which was passed at the time of the threatened strike in Indianapolis about two years ago, providing that motormen and conductors must have thirty days' experience before they may be employed by the Indianapolis Traction & Terminal Company to operate cars. The ordinance has been held unconstitutional by a Marion County court.

**Action on Removal of Kansas City Tracks.**—The City Council of Kansas City, Mo., has killed an ordinance providing for the removal of tracks of the Kansas City Railway from part of McGee Street. The particular significance of the action is that it seems to add to the probability that the interurban passenger station may be located near Tenth and McGee Streets. The City Council is considering measures for the establishment of a traffic way on Oak Street, one block east of McGee. The actions heretofore in behalf of a trafficway have designated McGee Street.

**Contract Awarded for New York Storage Yard.**—The Public Service Commission for the First District of New York has awarded to the Thomas J. Buckley Construction company, the low bidder, at \$372,893, the contract for the construction of a railroad yard for the storage of subway cars in connection with the White Plains Road extension of the first subway. The yard is officially designated as the 239th Street yard, although it will cover an area approximating several city blocks, beginning a short distance east of White Plains Road and north of 239th Street. Another yard is also under construction by the same contractor at 180th Street and Bronx Park. The 239th Street Yard will provide accommodations for approximately 580 subway cars. Adjoining it on a part of the same plot the Interborough Rapid Transit Company will later construct a yard having a capacity for about 350 elevated cars.



## Financial and Corporate

### ANNUAL REPORT

#### Albany Southern Railroad

The comparative income statement of the Albany (N. Y.) Southern Railroad for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Gross operating revenue:				
Railroad department.....	\$323,737	62.1	\$325,445	65.6
Electric department.....	152,253	29.2	129,729	25.9
Gas department.....	45,326	8.7	44,491	9.0
Total.....	\$521,316	100.0	\$499,665	100.0
Operating expenses, including taxes.....	376,667	72.2	366,083	73.3
Net operating revenue.....	\$144,649	27.8	\$133,582	26.7
Other income.....	2,347	0.4	3,110	0.6
Total corporate income.....	\$146,996	28.2	\$136,692	27.3
Deductions from income.....	95,217	18.3	91,719	18.3
Net corporate income.....	\$51,779	9.9	\$44,973	9.0

The gross operating revenue of all departments for the last fiscal year showed an increase of 4.3 per cent, while the operating expenses, including taxes and sinking fund charges, increased 2.8 per cent, thereby causing an increase of 8.3 per cent in the net operating revenue. The total corporate income showed an increase of 7.5 per cent, and the net corporate income an increase of 15.1 per cent. The operating ratio for the last fiscal year was 62.8 per cent, as compared to 64.5 per cent in 1915 and 67 per cent in 1914. Retirements and replacements and other surplus adjustments during the year amounted to \$32,430.

In the railway department the improved revenue for the latter half of the year almost made up for the decrease during the first half, the gross operating revenue being \$323,737 in 1916 and \$325,444 in 1915. The operating expenses of this department showed an increase of \$4,851, owing almost entirely to the sinking fund accrual. The following statistics will give an idea of the improvement in operating conditions in the railway department:

	1916	1915
Revenue passengers carried.....	1,475,423	1,452,739
Revenue passenger car miles.....	662,155	706,781
Revenue passenger car hours.....	50,946	50,227
Passenger revenue per passenger car mile....	\$0.268	\$0.260
Tons of freight carried.....	64,809	60,962
Power used, kilowatt hours.....	4,221,886	4,566,818
Maintenance of way and structures per mile of road operated.....	\$980	\$746
Maintenance of equipment per mile of road operated.....	\$600	\$507
Crew expense per passenger car mile.....	\$0.049	\$0.044

The annual report of the company states that it had suffered so much from accidents that most unusual care was taken to prevent them. Owing to the relatively large number of grade crossings and the greatly increased use of automobiles and the carelessness of their drivers, the company considered it expedient to put into effect a number of slow orders which necessarily lengthened the running time of the trains, but this action was met with general approval by the patrons, who appreciated the efforts of the management in eliminating hazards.

The report also notes that the electric express business is showing a most gratifying increase, it having been necessary to purchase two additional express cars. Under the new three-year agreement made with the employees on Feb. 23, 1916, the aggregate amount of increase in wages for each year will be about \$4,000. The amount spent on construction and new work in the railway department amounted to \$36,386, of which the largest item was \$16,283 for increasing the capacity of the Albany bridge floor.

The gross operating revenue of the electric department showed an increase of \$22,524 or 17.4 per cent, while the operating expenses increased only \$976. The gross operating revenue of the gas department increased \$834 or 1.9 per cent, and the operating expenses increased \$856.

The amount set aside for depreciation at the present time is 2.6 per cent of the value of the railway property, 1.3 per cent of the value of the electric property and 2 per cent of

the value of the gas property. Based on the physical values as of June 30, 1916, the total amount now being set aside to cover all provisions for maintenance and depreciation charges is \$97,365.

### BENEFITS OF CUSTOMER OWNERSHIP

#### Mutualization of Public Utilities Will Help Public Relations

##### —Broad Local Distribution Possible in from Three to Five Years

Inducing the consumers of a public utility to become financial partners of the enterprise is a movement which has made considerable progress during the last year and one-third at the properties under the general direction of H. M. Byllesby & Company, Chicago, Ill. The general practices of this organization in offering securities of utilities to citizens of the communities served was described in an article in the ELECTRIC RAILWAY JOURNAL of Aug. 12. In a paper presented on Sept. 22 before the Colorado Electric Light, Power & Railway Association, William H. Hodge, manager, publicity department of H. M. Byllesby & Company, described the work of his company along this line and summarized the situation in the following words, which will undoubtedly be of interest in connection with the article previously published in these pages:

"It has been demonstrated to our satisfaction that a broad distribution of the securities of a utility may be secured among the company's own customers by serious, careful and persistent effort over a reasonable time, say a period of from three to five years. It is not sensible to expect a new movement involving the constant savings of the people to accomplish fastest headway.

"The benefits to the utility and the public which assuredly will follow a wide distribution of a company's securities among its patrons warrant the effort and initial expense. The objects falling within range include the most vital things in the relations between the utility and the people. Achievement will go a long way toward solving controversial difficulties which have marred these relations in the past.

"Customer ownership will not mean a license for excessive profits or indifferent service. It will not permit a corporation to obtain undue favors from the legislative bodies of State and city. It will not give a company political security unless it keeps itself modern and efficient. Customer ownership, however, will establish friendly connections with a large number of citizens and voters, will share with them the earnings of the business and will so modify destructive criticism as to approach within reasonable distance of the equation which means peace, prosperity and recognition of useful service well performed. It is in line with the broadening trend of economics as understood today. It provides a simple and workable means to preserve the needful equilibrium between the producer and consumer—the natural and economical monopoly and the people. Customer ownership will humanize the utility corporation and give the people a true understanding of corporate affairs. It will do the corporation just as much good as it does the public, and no more."

Alton, Jerseyville & Peoria Interurban Railroad, Alton, Ill.—The County Court at Jerseyville, Ill., was to hear testimony on Oct. 7 in the suit asking for the appointment of a receiver for the Alton, Jerseyville & Peoria Interurban Railroad. The petition for a receiver is signed by the St. Paul Fire & Marine Insurance Company, the Hearne Timber Company, Jacob Kohlmeier, G. J. Gromme and others.

California Railway & Power Company, San Francisco, Cal.—The current dividend payment of 1 per cent on the prior preference stock of the California Railway & Power Company payable on Oct. 2 to stockholders of record on Sept. 20, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7, constituted a reduction from the last regular quarterly dividend of 1½ per cent paid on July 1. An official statement issued by the company says that while the United Railroads of San Francisco has heretofore punctually paid the interest upon its notes held by the California Railway & Power Company, it is apparent, in view of the prospective reorganization of this subsidiary company, that it is not likely to be able to make remittances during the period of such reorganization



As the parent company had the money on hand to pay the above dividend now, however, the board of directors decided to make the payment, calling attention to the fact that the dividends are cumulative.

Cape May, Delaware Bay & Sewell's Point Railroad, Cape May, N. J.—Vice-Chancellor Beaming in the New Jersey Court at Camden recently appointed Alfred M. Cooper of Cape May as receiver for the Cape May, Delaware Bay & Sewell's Point Railroad.

Cities Service Company, New York.—Montgomery, Clothier & Tyler; J. & W. Seligman & Company; Kissel, Kinnicutt & Company and Henry L. Doherty & Company have purchased the \$8,000,000 of 6 per cent cumulative preferred stock of the Cities Service Company, the authorization of which by the board of directors was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7. This stock is being offered by the above-named banking houses at \$93 a share. It is preferred as to both assets and dividends, is not redeemable and makes monthly dividend payments.

Northern Ohio Traction & Light Company, Akron, Ohio.—The stockholders of the Northern Ohio Traction & Light Company voted on Oct. 2 to increase the authorized amount of 6 per cent cumulative preferred stock from \$5,000,000, of which \$4,600,000 is outstanding, to \$10,000,000. The National City Company, New York, is offering \$4,000,000 of first lien and refunding mortgage 5 per cent gold bonds of this company at 94 and interest to yield 5.36 per cent. Reference to the new financing of this company in connection with the change of control to Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., had previously been made in these pages.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—A. B. Conant & Company, Boston, Mass, is offering privately, if, when and as issued, \$826,000 of first and refunding mortgage 5 per cent sinking-fund gold bonds of the St. Joseph Railway, Light, Heat & Power Company. The price is 94.5 and interest. The bonds are dated July 1, 1916, and mature on July 1, 1964. They are redeemable on any interest date at 102.5 and interest. A reference to the execution of a mortgage covering these bonds was made in the ELECTRIC RAILWAY JOURNAL of Oct. 7.

Sheboygan (Wis.) Electric Company.—Paine, Webber & Company, Chicago, Ill., having sold the greater part of the issue, are offering the unsold portion of the outstanding \$350,000 of 7 per cent cumulative preferred stock of the Sheboygan Electric Company at par and dividends. The stock is preferred as to assets and dividends. This company was formerly the Sheboygan Railway & Electric Company.

Union Traction Company, Philadelphia.—James G. Balfour and John C. Gilpin have been elected directors of the Union Traction Company to succeed George W. Elkins, resigned, and Jacob S. Disston, deceased.

#### DIVIDENDS DECLARED

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1 per cent, preferred.

Cleveland & Eastern Traction Company, Cleveland, Ohio, quarterly, one-half of 1 per cent, preferred.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly 1 per cent, common.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred and common.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1 per cent, common.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¼ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

Rome Railway & Light Company, Rome, Ga., quarterly, 1 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

#### ELECTRIC RAILWAY MONTHLY EARNINGS

##### BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16	\$74,805	\$42,000	\$32,805	\$17,884	\$14,921
1 " " '15	73,221	36,822	36,399	17,610	18,789
12 " " '16	806,971	438,398	368,573	211,851	156,722
12 " " '15	781,405	380,869	400,536	211,843	188,693

##### CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Aug., '16	\$100,238	\$67,335	\$32,903	\$29,962	\$2,941
1 " " '15	91,213	63,039	28,174	30,289	2,115
12 " " '16	1,204,145	754,506	449,639	356,744	92,895
12 " " '15	1,039,701	713,423	326,278	353,565	27,287

##### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Aug., '16	\$46,303	\$24,925	\$21,378	\$11,467	\$9,910
1 " " '15	45,047	21,002	24,045	10,974	13,071
8 " " '16	307,896	171,642	136,254	91,098	45,156
8 " " '15	281,139	155,787	125,352	87,785	37,567

##### COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Aug., '16	\$290,082	\$176,785	\$113,297	\$42,863	\$70,434
1 " " '15	242,299	158,572	88,727	40,232	48,495
12 " " '16	3,402,472	1,984,418	1,418,054	506,995	911,059
12 " " '15	3,056,293	1,813,726	1,242,567	470,899	771,668

##### COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Aug., '16	\$1,358,867	\$765,087	\$593,780	\$419,647	\$174,133
1 " " '15	1,181,948	649,007	532,941	372,679	160,262
12 " " '16	16,152,529	8,629,990	7,522,539	4,926,315	2,596,224
12 " " '15	14,088,122	7,552,322	6,535,800	4,346,834	2,188,966

##### EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Aug., '16	\$251,981	\$150,445	\$101,536	\$62,886	\$38,650
1 " " '15	205,259	121,539	83,720	62,421	21,299
12 " " '16	2,807,253	1,671,118	1,136,135	752,407	383,728
12 " " '15	2,434,872	1,449,601	985,271	761,017	224,254

##### GRAND RAPIDS (MICH.) RAILWAY

1m., Aug., '16	\$106,497	\$73,977	\$32,520	\$16,838	\$15,682
1 " " '15	101,207	73,136	28,071	13,966	14,105
12 " " '16	1,269,110	835,957	433,153	174,780	258,373
12 " " '15	1,202,935	831,178	371,757	163,970	207,787

##### HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., July, '16	\$31,808	\$15,966	\$15,842	\$5,241	\$10,601
1 " " '15	26,177	13,297	12,880	5,523	7,357
12 " " '16	310,051	172,408	137,643	65,324	72,319
12 " " '15	263,166	164,693	98,473	66,965	31,508

##### JACKSONVILLE (FLA.) TRACTION COMPANY

1m., July, '16	\$50,981	\$35,285	\$15,696	\$15,408	\$288
1 " " '15	50,097	34,890	15,207	14,597	610
12 " " '16	616,065	420,410	195,655	179,084	15,571
12 " " '15	637,938	445,116	192,822	168,165	24,657

##### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Aug., '16	\$167,567	\$89,799	\$77,768	\$36,455	\$41,313
1 " " '15	144,479	81,032	63,447	36,209	27,238
8 " " '16	1,054,433	663,977	390,506	290,972	99,534
8 " " '15	906,050	594,433	311,617	288,706	22,911

##### LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Aug., '16	\$87,115	\$58,180	\$33,935	\$15,075	\$18,860
1 " " '15	79,359	43,415	35,944	15,962	19,982
12 " " '16	779,888	518,633	261,255	190,633	70,622
12 " " '15	709,775	465,555	244,220	188,455	55,765

##### NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Aug., '16	\$199,574	\$122,736	\$76,838	\$42,236	\$34,602
1 " " '15	166,467	108,536	57,931	43,140	14,791
12 " " '16	2,316,748	1,423,419	893,329	513,635	379,644
12 " " '15	2,149,747	1,281,951	867,796	494,828	372,968

##### NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Aug., '16	\$473,434	\$291,304	\$182,130	\$47,995	\$134,135
1 " " '15	360,054	214,559	145,495	53,318	92,177
8 " " '16	3,334,077	2,011,571	1,322,506	403,001	919,505
8 " " '15	2,488,442	1,535,909	952,533	413,588	588,945

##### PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., July, '16	\$26,379	\$18,087	\$8,292	\$7,161	\$1,131
1 " " '15	23,196	14,400	8,796	7,538	1,258
12 " " '16	304,669	194,841	109,828	88,063	21,765
12 " " '15	291,458	184,201	107,257	91,807	15,450

##### PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Aug., '16	\$447,502	\$255,342	\$192,160	\$181,701	\$10,459
1 " " '15	460,861	257,583	203,278	186,507	16,771
12 " " '16	5,423,882	3,067,277	2,356,605	2,185,086	171,519
12 " " '15	5,668,404	3,084,326	2,583,578	2,210,856	372,722

##### PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., July, '16	\$663,746	\$418,230	\$245,516	\$184,645	\$60,871
1 " " '15	664,564	402,137	262,427	181,542	80,885
12 " " '16	7,709,641	4,954,027	2,755,614	2,202,477	553,137
12 " " '15	7,846,587	4,804,798	3,041,789	2,155,481	886,358

\*Includes taxes. †Deficit.



## Traffic and Transportation

### SUMMARY OF FINDING IN "OWL" FARE CASE

#### Pennsylvania Commission Decides That Increase in "Owl" Fare in Pittsburgh Was Not Properly Advertised

As noted briefly in the *ELECTRIC RAILWAY JOURNAL* of Sept. 30, page 699, the Public Service Commission of Pennsylvania in an opinion rendered on Sept. 28 held that the Pittsburgh Railways acted in violation of both the spirit and the letter of the Public Service Company Law of that State in the way in which it proceeded to give notice of the doubling of its "owl" or night fares, and in an order supplementary to the opinion directed the company to cease from collecting any rates or enforcing any rules or regulations except those contained in its original tariff filed on July 17, 1914, and further ordered the company to make reparation to its patrons for excess fares upon presentation of certificates of excess payment issued under order of the commission since June 23.

The opinion was based on the complaints of William Jacoby and the city of Pittsburgh against the Pittsburgh Railways, alleging that the proposed increase of rate of fare for night car service in Pittsburgh was unjust, unreasonable and excessive. A complete review of the case is contained in the opinion, which was written by Commissioner Michael J. Ryan and acted upon by the entire body in executive session. In reviewing the filing of the proposed change in rates the commissioner's report says:

"The company contends that this folder (two typewritten pages containing rates which it claims to be a change in the original tariff) is a supplement to the original schedule and the sending of it to the Public Service Commission and the placing of a copy thereof in the general offices of the company at Pittsburgh and its dispatchers' offices in various carhouses of the company constitute ample notice to the public and is sufficient and adequate compliance with the Public Service Company Law to warrant its doubling its charges for night service upon the cars operated by it in and about Pittsburgh."

The displaying of the notice of the increase in the company's cars on June 21, the night of the day preceding the date on which the increased fares were to become effective is then mentioned, together with the insertion of full page advertisements calling attention to the proposed change in all the daily papers of Pittsburgh. Next is reviewed the filing of the complaints by W. M. Jacoby and the city of Pittsburgh, the preliminary public hearing held at the Capitol on June 23, and the issuing of the order directing the company to issue certificates in excess of the former rates pending the determination of the matters alleged. Next is reviewed the public hearing held June 30, when testimony anent the notice to the public was heard. Commissioner Ryan continues:

"The Public Service Company Law distinctly requires that no change in the rates of fare shall be effective 'except after thirty days' notice to the commission and to the public.' It is required that a public service company shall plainly state the exact changes proposed in the tariffs or schedules then in force and whether an increase or decrease and the time when the proposed changes will go into effect. Although the paper filed with the commission has the sub-division 'night fares' on page two in darker ink than the rest of the page, it is admitted that all copies filed by the company at any place in Pittsburgh or adjacent territory are merely photographic copies and that there is no difference whatever in the coloring and that there is no 'black type' on those to put any inquirer upon notice. The only place (other than with the commission at Harrisburg) where the alleged supplement was filed were the general offices of the company in Pittsburgh and various dispatchers' offices and carhouses of the company.

"When the Pittsburgh Railways determined that a change in its rates of fare was desirable it could have done either of two things in accordance with law: First, filed, posted

and published new tariffs or schedules; this admittedly it has not done; or secondly, it could have indicated the proposed changes plainly upon the tariffs or schedules now in force and kept open to public inspection. It seems to the commission that the methods followed by the respondent company do not comply with the law. There is nothing whatsoever in the supplement filed which plainly states the exact changes proposed to be made. There is nothing in the supplement filed that indicates whether or not there is to be an increase or decrease in fare. That the company itself did not believe the folder and inclosure and the placing of it in its office and carhouses would impart knowledge of the proposed increase in fare to the public, is shown by its own conduct on the day the proposed changes in the rates were to take place when it caused to be posted the large lettered announcement of the increase, and by advertising in the daily papers in the city the full page notice of the change in rates.

"The posters put up in the cars carried information in letters 2 in. in height so that all could know, but up until then there was not the plain statement of the exact changes proposed to be made, nor was notice properly given. We are of the opinion that the action of the company is in violation of both the spirit and the letter of the law.

"Public service companies are public servants—subject to the control of and regulation by the Commonwealth. They may increase their rates and charges when sanctioned by the authority which gives them life and in accordance with the law and that there can be no doubt that openness, fairness of dealing with and confidence in that public which they serve are the best methods to be employed to more certainly obtain that justice to which not only public service companies but the people are alike entitled."

Commissioner Ryan then states that no opinion is expressed with regard to the authorization of an increase in rates. In this connection he says: "When that matter comes before us in the regular way and after full hearing shall be had, this commission will decide." He concludes by saying: "The commission finds that the supplement is not a legally filed, posted and published tariff of the Pittsburgh Railways and that the only tariff or schedules of said company in effect on June 21 or at any time subsequent is the original tariff of June 17, 1914.

The order to cease collecting the excess fare and to make restitution of the excess fares paid by patrons is then affixed.

### "AN AUTOIST APPLIES THE GOLDEN RULE"

Under the caption "An Autoist Applies the Golden Rule" the Hot Springs (Ark.) Street Railway published in the local papers in that city recently the following fable in the form of a full page advertisement addressed "Fellow Automobile Owners":

"I live at the extreme end of one of the street car lines and make the morning, noon and night trips between my home and place of business in my automobile.

"Shortly after purchasing the auto, and feeling confident of my ability to operate it safely, I acquired the habit of picking up acquaintances whom I found at street corners intending to board street cars. The first morning I stopped to pick up my friend Jones. I had plenty of room and hated like the mischief to pass him up. I thought he would vote me selfish and stuck-up since I purchased my auto. On the way down town Jones said to me, 'Now let me off any place; don't go out of your way for me.' But it did not seem the right thing to put Jones off at any place except his exact destination. So I insisted that he tell me where he was going and the result was that I went four blocks out of my way to be nice to him.

"The next morning it was my luck to find Jones on the corner waiting for his street car. He had two friends with him. I had plenty of room. I sounded my auto horn to indicate I was coming and I called out, 'Going down? Jump in!' So they did. I wanted to be just as big and broad as the day before and took Jones to his destination, four blocks out of my way. His two friends seemed anxious to cause me as little trouble as possible and wanted to jump out with Jones, but I would have none of that, and the discussion finally ended by my taking both to their destination.



They felt ill at ease but I owned an automobile, and they did not, and I was bound to be a good fellow.

"So things went on until I found myself operating a free service line to and from town. Jones and his friends would frequently look the other way when they saw me coming down the street. Often they would plead they wanted to walk for the exercise but I would go to the expense of stopping my car for them and was so insistent they finally would give in. At times I would have my wife and children along and did not care to have company in the car, but if I saw Jones and his friends I did not have the courage to pass them by.

"Recently I met an official of the street railway. In our talk about business he gave me an insight to the street railway conditions of to-day that opened my eyes. I will repeat to you the statements he made to me: 'He stated there were more than 375 privately owned automobiles in the city, and by reason of the practice of the owners picking up friends along the streets it was conservatively estimated the street car company was losing an average of 50 cents an automobile a day. This in addition to the loss of patronage of the owners and families which the street car company enjoyed before the purchase of the automobile. He called attention to the fact that the owners of the street car company were the heaviest investors of outside capital in this city; that they were the heaviest taxpayers; that one-third of all the paving in this city was at the street railway company's expense; that many thousands of dollars were paid to men in the company's employ who had homes in this city and families to support; that additional thousands of dollars were expended with our merchants annually in the purchase of supplies and material, preference being given to home merchants even though the goods could be purchased at a less cost outside the city; that the company was among the heaviest contributors to advertising, State Fair and other funds necessary to create business for the welfare of our citizens; that it took part in all movements for the upbuilding of the city; that it contributes and pays taxes toward good roads which you and I enjoy in our automobiles; that it maintains training grounds at a loss and furnishes free transportation for the baseball teams visiting this city for their spring practice; that car tickets can be purchased in book form twenty-five for \$1 or 4 cents each, and that school tickets are sold in book form at 2½ cents each; that it operates its cars about twenty hours a day under a schedule which for frequency of trips is seldom enjoyed by other cities.

"Fellow Autoists, when I take Jones and his friends in my automobile in the future, it will be on a pleasure trip, not competitive to our own street railway.

"Note—It will be the aim and pleasure of this company to continue to be a factor in the upbuilding of Hot Springs, and we hope our friends will be lenient should we fail at times to do all that we should desire. Bear in mind that our only revenue is secured from passengers picked up along our lines. This little fable is printed to acquaint you with new conditions that are confronting street railways in all small cities, due to the advent of the automobile, which we believe has come among us to stay."

#### SEATTLE BUS BILL DEFEATED

The City Council of Seattle, Wash., by a vote of five to four defeated the passage of the Dale ordinance for the regulation of jitney buses in Seattle, and went on record as opposing the submission of the question of regulation to the voters at the general election on Nov. 7. Councilman Dale, in Council, asked that some action be taken upon the measure to regulate the jitneys, saying the city's inaction on the subject had caused the State Legislature to act, and that he feared the certificate of public necessity act, which will be voted upon in November, if not defeated would empower the Public Service Commission to eliminate jitney competition altogether. Rejection of the Dale bill means that the regulation of the motor buses will be undertaken by the Council itself, and will not be submitted to the voters. The special committee appointed more than a month ago composed of Councilmen Moore, Hanna and Heskestad, to report upon the question will prepare a bill for passage by the Council.

#### JITNEYS AS STEAM RAILWAY COMPETITORS

A further examination of the reduced passenger service on the Spokane, Portland & Seattle Railway, which was announced in the *ELECTRIC RAILWAY JOURNAL* for Sept. 16, page 515, brings out some interesting side lights on the case. It develops that the railroad, as the largest taxpayer, has been the largest contributor toward the finely paved highway, which has been finished and opened to jitney travel gratis, and without which the jitney service would never have sprung up there.

There are five road districts in Clatsop County, and the railroad pays taxes in each, amounting to a total of 5.5 cents on each dollar of assessed value of its properties. Thus, under the county laws the railroad has been paying \$10.55 a day in taxes toward the construction of the new highway and when the interest on the bonds for the paving begins to accrue, the company may expect an increase in the rate of the taxes used for this purpose.

Several other western steam lines have reduced train service, and the effect of jitney competition has been severe wherever the highway parallels the tracks. On the occasion of a recent convention in western Washington for which steam line excursion rates were offered, 2700 people came into town from points distant 18 miles or more, and of this number only 350 traveled by train. To attend this same convention, ninety delegates had to travel 275 miles, and fifty others 250 miles across the mountains.

**Relief for Traffic Congestion in Kansas City.**—After several months' study of traffic conditions, the legal department of Kansas City, Mo., has prepared an ordinance for relieving traffic congestion in the business district. The ordinance eliminates parking of motor cars on the streets of the downtown district, where many streets are narrow and the parking of cars requires vehicular traffic to follow the street cars in the busy hours.

**Newspaper Train from Chicago Loop to Waukegan.**—The first through service to the North Shore district via the Chicago Elevated Railways and the Chicago, North Shore & Milwaukee Electric Railway was begun on Oct. 1. This service consists at the present time of an express car carrying Chicago newspapers. This train leaves the Metropolitan terminal station on Fifth Avenue, between Jackson Boulevard and Van Buren Street, and runs to Waukegan, Ill. Britton I. Budd, president of both companies, inaugurated this service for the benefit of the Chicago newspapers in distributing to the North Shore district.

**Railway Participates in Fire and Accident Prevention Celebration.**—The Kansas City (Mo.) Railways took an active part in the celebration of fire and accident prevention day on Oct. 9. J. H. Harvey, superintendent of efficiency, of the company, is president of the Local Safety Council, which assisted in the work, and is chairman of the committee on distribution of literature. The committee on celebration provided the literature, largely prepared by Mr. Harvey, and the railway company distributes it, 40,000 pieces going to the schools on Friday, Oct. 6. The company also had one of the eighteen floats in the parade. In addition to the floats there were trucks or cars by the various city departments, and seventeen pieces of apparatus by the fire department. Many local organizations were represented by cars carrying the members of their fire or accident prevention committees.

**Vehicle Drivers Reported for Indifference.**—A recent incident in Kansas City, Mo., indicates the ease with which a general movement for improving traffic conditions can be stimulated. The Kansas City Railways has been having its trainmen note the drivers for retail and other establishments who most often interfere with the prompt moving of traffic. The trainmen were already largely familiar with the offending drivers, and reports came quickly. The officers of the railway company reported the drivers to the merchants. In most cases the latter expressed gratitude at the suggestion, and many asked the railway for further assistance in this manner. In some cases the merchants established new rules, and issued special instructions as to watchfulness of the interests of others by their drivers, taking the position that with everybody trying to keep all the traffic moving, the general good results would be shared by all.



## Personal Mention

**H. O. Swoboda**, Pittsburgh, Pa., has been appointed in a consulting capacity by the Pittsburgh & Butler Railway, Butler, Pa., to take care of its interests in connection with the agreements which it made with the West Penn Power Company.

**Alston Green** has been elected vice-president of the Alabama City, Gadsden & Attalla Railway, Gadsden, Ala. Mr. Green will have charge of the office of the company and of the sale of current. He has lived in Gadsden all his life and has a wide acquaintance in the city and county.

**James G. Wray**, chief engineer of the central group, Bell Telephone Companies, has resigned to become associated with the firm of Hagenah & Erickson, public utility engineers, First National Bank Building, Chicago, specializing in appraisals, cost analyses and rate investigations.

**H. L. Brown**, who succeeds E. M. Haas as Western editorial representative of this paper, was graduated from the electrical engineering department of the University of Michigan in 1912, and during his senior year there was assistant to Professor de Muralt, then head of the department. After two years spent in technical journalism, Mr. Brown became connected with the Chicago Telephone Company's engineering department and remained with this company for about a year, when he joined the editorial staff of the *Electrical World*.

**Exum M. Haas**, who for the last five years has been Western editorial representative of the *ELECTRIC RAILWAY JOURNAL*, has resigned from this paper to accept the office of manager of sales of the International Steel Tie Company. He will be succeeded by H. L. Brown, who for the last year has been assistant editor of the *Electrical World* in Chicago. Mr. Haas, after graduation from the civil engineering course of Purdue University in 1905, was resident engineer for the Chicago & Eastern Illinois Railway in the construction of a 6000-car capacity freight yard in Dalton, Ill. In 1906 he was appointed assistant engineer of maintenance of way for the Illinois Traction System, where he helped to organize the maintenance of way department and served as locating and constructing engineer for the company in charge of building extensions for the system. In 1909, when work on the track extensions had practically ceased, his title was changed to superintendent of bridges and buildings, and while he served in this capacity most of this company's standard way stations and substations and the terminal stations in St. Louis, Mo., were built. He has been a member of the 1915 and 1916 way committee of the American Electric Railway Engineering Association.

**Dean Treat**, assistant general manager of the Wisconsin Public Service Company at Green Bay, has been promoted to the position of general manager of the Wisconsin Railway, Light & Power Company at LaCrosse, Wis., one of the Clement C. Smith properties. Mr. Treat began his railway career as timekeeper for Westinghouse, Church, Kerr & Company during the construction of the Grand Rapids, Grand Haven & Muskegon Interurban Railway, and remained with that company until 1907, when he was promoted to the position of assistant trainmaster. He resigned from the last-mentioned company to become assistant superintendent of construction of the Milwaukee & Northern Railway and remained with that company until 1910 as superintendent of transportation. He then became superintendent of the Sterling, Dixon & Eastern Electric Railway, and in 1912 was made manager of the Lee County Light Company. On the sale of that property to the Samuel Insull interests Mr. Treat was made district superintendent of District "D," where he remained until January, 1913, when he resigned to become superintendent of railways of the Wisconsin Public Service Company at Green Bay, Wis. He was subsequently promoted at Green Bay to assistant general superintendent, then to assistant general manager and from that position he was finally promoted to LaCrosse as general manager at that place.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

### FRANCHISES

**Harvard, Ill.**—The Chicago, Harvard & Geneva Lake Railway has asked the Council for permission to abandon its trackage on North Division, West Diggins and North Eastman Streets entering the city over its freight line through the Logue and Brainard farms, thence to the city limits and along West Front Street to Eastman and thence to the Chicago & Northwestern Railway depot.

**Bowling Green, Ohio.**—The City Council of Bowling Green has adopted a resolution granting the Toledo, Fostoria & Findlay Railroad a fifteen-year franchise if it will buy the property of the Lake Erie, Bowling Green & Napoleon Electric Railroad, which the owners have decided to sell for junk.

**San Angelo, Tex.**—The City Commission of San Angelo has refused the petition of J. E. Willis of Abilene for a franchise for a street railway system in San Angelo. The reason for this refusal, as given by the commission, was that they had under consideration a proposition submitted by the Interstate Electric Corporation of New York, which they will probably accept.

### TRACK AND ROADWAY

**Calgary (Alta.) Municipal Railway.**—It is reported that the Calgary Municipal Railway will construct a mile of track over the West Center Street bridge, now under construction.

**Capital Traction Company, Washington, D. D.**—With the dual purpose of affording transportation facilities to Potomac Park and relieving street car congestion at Fifteenth Street and New York Avenue, the Capital Traction Company has applied to the Public Utilities Commission for permission to extend its lines south on Eighteenth Street to C Street, where it is proposed to construct a terminal loop around the triangle between Eighteenth Street, C Street and Virginia Avenue. The improvement calls for an expenditure of about \$100,000. If authorized by the commission, work on the project will start early next year, and effort will be made to complete it by July. Under the plans submitted the company would place additional special work at the intersection of Fifteenth Street and New York Avenue, providing a double-track connection between the present tracks of the Fourteenth Street line on New York Avenue and the present tracks on Pennsylvania Avenue west of Fifteenth Street. It is proposed to operate Fourteenth Street cars in the new Eighteenth Street service. The company also applied for permission to build a connecting track between the proposed southbound track on Eighteenth Street and the existing track on F Street. With this connection installed, cars from the Fourteenth Street service proceeding down Eighteenth Street would be able to return either by way of the suggested loop terminal at Eighteenth Street, C Street and Virginia Avenue, or by making a loop via F and Seventeenth Streets.

**Chicago, North Shore & Milwaukee Electric Railway, Highwood, Ill.**—B. J. Fallon, chief engineer of the Chicago, North Shore & Milwaukee Electric Railway, has announced that the company will lay 350 tons of new rails this fall; also it will double track some single track sections and will replace a 100-ft. pile-bent trestle by a large concrete box and fill. The company has recently purchased fifteen sets of crossing gates, and also twelve Bryant Zinc Company highway crossing signals. Inquiries are out for a considerable number of additional highway crossing signals to be installed at crossings between Evanston and Milwaukee.

**Mason City & Clear Lake Railroad, Mason City, Iowa.**—This company reports that it expects to build 1½ miles of new city track in Mason City.



**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—This company has authorized a \$15,000,000 refunding bond issue for the retirement of its present outstanding bonded indebtedness of \$5,000,000 and for improvements and extensions. The extension will be in the direction of Atchison or northeast of Maryville, Mo.

**\*Ardmore, Okla.**—Plans are being made at Ardmore for the organization of a company with local capital which will build an electric interurban railway from Ardmore to the newly discovered Fox oil field. It is stated that the Ardmore Railway Company is interested in the project. Surveyors will take the field at once for the purpose of making preliminary surveys. The plans in contemplation include an extension to the Washita River and the development of water power from that stream.

**Dominion Power & Transmission Company, Ltd., Hamilton, Ont.**—About 1 mile of track has been practically completed by the Hamilton Street Railway, a subsidiary of the Dominion Power & Transmission Company, on Wentworth Avenue between Barton and Burlington Streets.

**Williamsport (Pa.) Passenger Railway.**—Plans are being considered by the Williamsport Passenger Railway for the construction of an extension into Newberry.

**Dallas (Tex.) Consolidated Street Railway.**—The City Commission has revoked its order to the Dallas Consolidated Street Railway Company requiring the company to lay 103-lb. girder rails on Tremont Street from Beacon to the City Limits. The new order requires the company to lay 80-lb. T rails. The change in order of the commission was made on petition of the company, which claimed that to carry out the commission's original order would mean bankruptcy for the company.

#### SHOPS AND BUILDINGS

**Boston (Mass.) Elevated Railway.**—Plans for extensive changes at the Forest Hills station of the Boston Elevated Railway, for the purpose of relieving congestion on the street surface platforms during rush hours, have been submitted to the Public Service Commission by L. S. Cowles, engineer. Mr. Cowles explained that it is purposed to lay another track on the westerly side of the southbound platform, thus creating an island but increasing the loading facilities to an extent that would care for the heavy traffic during the morning and evening rushes. The portion of the station it is designed to use for the new tracks is now devoted to vehicular traffic, but there is plenty of room outside for street-widening purposes.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—It is reported that this company will construct a combined passenger and freight depot, together with sufficient switching facilities, at the corner of North Court and Friendship Streets, Medina.

**Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.**—The Ohio Valley Traction Company, a subsidiary of the Portsmouth Street Railroad & Light Company, will construct a carhouse at the corner of Third and Lawrence Streets, Ironton.

**Three Rivers (Que.) Traction Company.**—This company has completed an 85-ft. extension of its carhouse and shop building, doubling the car capacity.

#### POWER HOUSES AND SUBSTATIONS

**Louisville & Northern Railway & Lighting Company, New Albany, Ind.**—Preparations are being made by the Louisville & Northern Railway & Lighting Company for the installation of a new street lighting system in Charles-town.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—A 1300-volt transmission line is being erected by this company to the plant of the Brunt Tile & Porcelain Company, which formerly operated an isolated power plant. New motors and equipment will be installed when the transmission line is completed.

**Republic Railway & Light Company, Youngstown, Ohio.**—Plans have been made by the Republic Railway & Light Company for the addition of a third 20,000-hp. generating unit to its Lowellville power station, but it is stated that, owing to present conditions in the electrical industry, it will not be installed for some time.

## Manufactures and Supplies

### CAR PAINTING MATERIALS ARE HIGH

**Enameling Process Gains in Favor—Deliveries Normal, Except for Reds**

Trade conditions in the paint, oil and varnish field have been moderately active during the summer. The comparatively large number of cars ordered during the first six months of the year stimulated buying to a point considerably above the average of 1915. Prices now are high. Linseed oil has been as high as 82 cents a gallon. Zinc oxide has touched 35 cents a pound, and the imported brilliant reds have been exceptionally high with prices very unstable. White enamel, such as is most commonly used, and which was formerly priced at \$2.50 to \$2.75 a gallon, is now \$4 a gallon, and reds that were \$3 a gallon are now \$4.50 a gallon and higher. With zinc oxide at 35 cents a pound, and 5 lb. required in the composition of a gallon of white enamel, it is easily seen why the price for the mixed product is now especially high.

Master painters used to hold to the opinion that white lead as such must be "pure" white lead, but now a substantial number of painters in car construction and maintenance fields think that for some purposes it is desirable to add zinc to a white lead mixture.

There is a growing tendency among the electric railway lines to change the outside painting of cars from paint and oil coats with varnishes to enamel. The idea of producing a piano finish is giving way to more practical plans of reducing the number of coats by applying enamel. Back of this movement is the idea that there will be a reduction, not only in the first cost but in the renewal cost. This is particularly true with steel cars. If a wooden car becomes badly marked it is necessary to scrape off the paint down to the wood and build up the several coats with especial care in order to match the colors and then to finish with the varnish coat. With enamel, the injured parts can be quickly filled in at less cost and with better results than when oil coats and varnish are used.

One reason for the increasing use of car enamel is the availability of improved products, resulting from greater attention having been given to enamels by manufacturers. As now ground in the paint factories, the enamels give much better finish than when the painters themselves used to grind their own color into varnish. It is pointed out by the manufacturers that a larger use of enamel for car exteriors will reduce the demand for varnish. On some roads, however, it is the practice to varnish over the enamel.

With regard to the orders placed during the last few months, none of these have been especially large. In the North Central States Kansas City has probably bought as much painting material in proportion to the size of the property as any road. That property has been changing its standard color from dark green to a light yellow with white trim and so has been doing an especially large amount of painting.

On most of the medium-sized roads that have formerly maintained revarnishing and repainting schedules, it is noted that during the past two years these schedules have not been followed, but rather it has been the practice to delay two or three months on the renewal work.

Except for the venetian reds, deliveries on paints, varnishes and enamels are practically normal.

### PACKING MATERIALS HOLD UP DELIVERIES

**Lumber, Cardboard, Fiber and Other Materials Are Difficult to Obtain and Prices Are Greatly Advanced**

In addition to a scarcity of raw materials for their products manufacturers are face to face with a serious shipping problem in the matter of packing materials. These materials are scarce and in some instances are holding up deliveries. Lumber, fluted cardboard, fiber and other packing materials are difficult to obtain, and prices have advanced materially.



The amount of lumber used each year in crating machinery and for packing boxes in the industry is enormous. In many electrical lines it has been superseded by fluted cardboard, but events of the last year or so, it is understood, have disturbed this supply also.

#### NEW LUMBER ASSOCIATION STANDS FOR UNIFORM GRADES

A new national association has been formed, under the name of the National Retail Lumber Dealers' Association, whose object it is to establish uniform grades of lumber in all parts of the country. The purpose intended is that a customer may know what he will receive when he places an order for a specific grade. The association indorses the extensive branding of lumber as a means of guarantee to the consumer that he will get the quality of lumber he desires as well as the use of trademarks and of extensive advertising of lumber.

#### ROLLING STOCK

Jackson Light & Traction Company, Jackson, Miss., has ordered two cars from the Southern Car Company.

Chicago (Ill.) Surface Lines are in the market for thirty cars similar to those purchased in 1914. These are for replacement of equipment destroyed by fire and damaged in the service.

#### TRADE NOTES

Consolidated Car-Heating Company, Albany, N. Y., has received an order from the Bay State Street Railway for 436 car equipments of Consolidated buzzers.

Roller-Smith Company, New York, has appointed as its representative in Birmingham, Ala., Jonathan Haralson, Brown-Marx Building, who will handle Roller-Smith instruments, circuit breakers and Columbia meters.

Hess-Bright Manufacturing Company, Philadelphia, Pa., at a meeting of the board of directors on Oct. 6 elected B. D. Gray president to succeed F. E. Bright, who remains identified with the company as chairman of the board.

H. W. Johns-Manville Company, New York, N. Y., has just opened a new branch office at Great Falls, Montana, in the Ford Building, Room 418, in charge of J. H. Roe. With the opening of the Great Falls office the Johns-Manville Company increases its number of branches to fifty-five.

H. W. Finnell was recently elected vice-president of Templeton-Kenly & Company, Ltd., Chicago, manufacturer of Simplex jacks for industrial and railroad purposes, and also for automobile use. He assumed his duties with that company on Oct. 1. Just prior to his present affiliation, Mr. Finnell was general manager of the Henry Giessel Company, in which concern he still retains his interests. He has been intimately connected with the railway supply industry for more than ten years.

Cooper Heater Company, Carlisle, Pa., has recently shipped the following orders for hot air heaters: Cincinnati Traction Company, 100 No. B-2; Johnstown Traction Company, forty-seven No. B-2; Northern Ohio Traction & Light Company, thirty-six; Pittsburgh Railways, 112; Beaver Valley Traction Company, twelve; Omaha & Council Bluffs Street Railway, twenty-five; Evanston Railway, twenty-seven; Steubenville & East Liverpool Railway, five; Muskegon Traction & Light Company, four; Cumberland & Westernport Railway, seven; South Covington & Cincinnati Traction Company, twenty-five; of the No. B-4 type: Lehigh Valley Transit Company, twelve; Stark Electric Railroad, seven; London & Port Stanley Railway, three; of the No. B-5 type. Also the following orders for No. 15 hot water heaters: Easton Transit Company, six; General Electric Company, four; Milwaukee Northern Railway, ten; Shamokin & Mount Carmel Railway, two; Missouri & Kansas Interurban Railway, two.

#### ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, is distributing an illustrated circular describing the O-B emergency fire hose bridge.

American Catalogs to Be Distributed at Lyons Fair.—The Annual Fair at Lyons, France, will be held from March 1 to 15, 1917, inclusive. Buyers from all parts of the world will be present, and it is desired to have as large a representation of American manufactures as possible. The State Department has placed \$500 at the disposal of the American Consul, which will enable him to distribute the catalogs and other literature of American manufacturers who are interested. The catalogs of those interested should be forwarded direct to the consul at Lyons.

Holden & White, Chicago, Ill., have issued a new catalog on Perry-Hartmann side and center bearings, which are manufactured by the Joliet Railway Supply Company. This catalog describes and illustrates the Perry double-roller, roller-bearing side bearings and the Hartmann self-centering ball center plate. It includes a chart showing the wheel flange pressure of a friction center plate compared with that of the Hartmann centering center plate. It illustrates in cross section the means for obtaining a surface contact on the centering plate balls to carry the load and, at the same time, operate in inclined pockets. Dimension drawings of the bearings are shown and also six full-page drawings of various applications of these side and center bearings to car trucks. The reading matter includes chapters on the necessity for roller side bearings and the advantages to be obtained by centering center plates.

#### NEW PUBLICATIONS

European Economic Alliances. National Foreign Trade Council, New York, N. Y. 117 pages. Paper, 25 cents.

This pamphlet is a compilation of information on international commercial policies after the European war and their effect upon the foreign trade of the United States, as well as an analysis of European and United States commercial interdependence and treaty relations. Expository rather than argumentative, the book is simply part of the work done by the National Foreign Trade Council in investigating the problems arising in foreign trade, and it offers in convenient form essential information on this subject of such present importance.

Manual of American Railway Engineering Association.—Edition of 1915 published by the American Railway Engineering Association, Chicago, Ill.

This is a volume containing the standards and recommendations of the various committees of the American Railway Engineering Association. With the various subjects reference is given to the volume of the proceedings for the full context of the committee reports and discussions. The 1915 edition is the fourth revision of this association's manual, which was first published in 1905. The subject matter includes the recommended standards on roadway, ballast, ties, rail, track, buildings, wooden bridges and trestles, masonry, signs, fences and crossings, signals and interlocking, records and accounts, rules and organizations, water service, yards and terminals, iron and steel structures, economics of railway location, wood preservation, electricity and conservation of natural resources. Standards recommended by special committees on the classification of railways, grading of lumber and uniform general contract forms have also been included in this manual. In order to make this volume as useful as possible for reference purposes, a complete index of the various subjects treated by the American Railway Engineering Association's standing committees has been prepared. The manual contains 680 pages and is intended for distribution among the members of this association.

The Earnings Power of Railroads. 1916 edition. James H. Oliphant & Company, 61 Broadway, New York, N. Y. 514 pages. Leather.

This is the latest edition of the valuable financial reference book presented to investors by the above-named banking houses. There are the usual introductory chapters explaining the fundamental principles to be used in the analysis of stock and bond values; tables giving vital statistics regarding earnings, mileage, capitalization, tonnage, etc., and notes presenting information as to dividends and other points of direct interest to investors. Those interested in steam railroad securities find this book both handy and valuable.





## Are You Immune to Bad Fairies?

The old Irish peasantry had such a wholesome respect for bad fairies that special magic phrases were pronounced at the naming of an infant to make it proof against all kinds of fairy trickery. If these phrases worked, the beneficiary could look a fairy right in the eye and tell it to go to—anywhere.

Wouldn't you like to look **your** bad fairies—your rundowns and collisions—in the eye until they shrunk or disappeared from view?

But in this hard-headed age you can't make yourself immune to accidents through charms, wishes or incantations.

You've got to have the goods!

Peacock Brakes are the goods. Have you got 'em?



The Eccentric  
Drum

## National Brake Co.

Buffalo, N. Y.



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Correspondence regarding our service is invited.

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## IT IS A PAYING INVESTMENT

to carry an advertisement in the ELECTRIC RAILWAY JOURNAL  
every week in the year.



# AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes  
particularly BRIDGES AND BUILDINGS*



Transmission Towers at Birmingham, Alabama. Alabama Power Company.

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## It Would Be Almost a Miracle

if one or more of the 8,000 men who regularly receive the JOURNAL did not happen to want that used machine which you want to sell. The

## Searchlight Section

brings buyers and sellers together

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POWER STATIONS  
HYDRAULIC DEVELOPMENTS  
PHILADELPHIA, PA.  
GAS WORKS  
ELECTRIC RAILWAYS

## Earnings are an Indication of Operating Conditions

but it takes experts to analyze the relations between them.

## Expert Investigation and Report

is a sure means of determining where improvement is possible in operation, if earnings are not satisfactory.

We make a specialty of such investigations, of surveys and reports. We supervise the construction and management of electric railways, light, gas, water and power plants and appraise physical properties.

**ROOSEVELT & THOMPSON**

Engineers

71 Broadway

New York



The  
difficulty,

Smithville, July 10, 1916.

Jonesboro Railway Company,  
Jonesboro, Me.

Gentlemen:

We very much regret that we cannot fill your requisition No. 84, for shop and track tools, immediately because of the heavy demand on machine tool makers throughout the country. In fact, we could hardly guarantee to deliver the lathes and drills before six months.

and for furnace and forging equipment to lever jaws and draft rigging is also

Manufacturers of Machinery and Equipment for Electric Railways are doing their utmost to supply the insistent demands for quick and quicker deliveries. It's rush—rush—RUSH—*Double Rush*—in their shops, day and night, but still the orders come, and still the demand goes on. Both manufacturers and railways have solved their problems by purchasing and using second-hand machinery and material. To locate quickly the equipment you need so much,

## Use the Searchlight Department of Electric Railway Journal

It  
pays—  
quick]

You will be put in touch *at once* with owners who have such apparatus for sale. Searchlight ads reach into every nook and corner of the electric railway industry, whether user or maker. No matter how small the ad, or how inconspicuous, it cannot be hidden. There are no pages in the publication more thoroughly scanned, more carefully read, than the Searchlight ads.

It  
pays—  
big

### Sell Discarded Apparatus

There is a waiting market for any and every piece of Machinery or Equipment which will aid in the manufacture of electric railway supplies. Let this thought be the father to the act of writing out a statement of what you have for sale, to be inserted in the Searchlight Department of "Electric Railway Journal." It is read by the BUYERS.

### Get the Help You Need

Every incompetent in a job keeps some competent man out of it. The proper employee for the place can be found—by using the Searchlight Department. WORKERS read "Electric Railway Journal."

### Do You Want a Position

There are lots of them open—there is a market for your abilities. An "Electric Railway Journal" Searchlight Ad will put you in touch with EMPLOYERS. Advertising rates are low and returns quick.

The  
solution,

The demand  
make brake levers, brake  
particularly active.

If you must have equipment of this kind pending our building of new tools for you, we suggest an advertisement in the Searchlight Section of the Electric Railway Journal. Without doubt, you will find some manufacturer or railway that will be glad to sell you second-hand equipment at a modest figure. Such an advertisement will cost you only a few dollars and will save you both money and annoyance.

In the meantime, we will make all possible dispatch with your requisition.

Yours truly,

ELECTRIC RAILWAY SUPPLY COMPANY

By A.O.B.



# The Gould Automatic Slack Adjuster

## A Simple Adjuster Adapted to All Types of Electric Railway Trucks

The Universal Type Brake Slack Adjuster first went into use in 1908 and 1909, on several hundred cars, and fulfilled all requirements for steam railroad service. Since then our Engineer, W. H. Sauvage, who has made the Automatic Brake Slack Adjuster his life work, has further perfected the Universal Slack Adjuster so that it is applicable to all types of trucks and kinds of electric railway service.

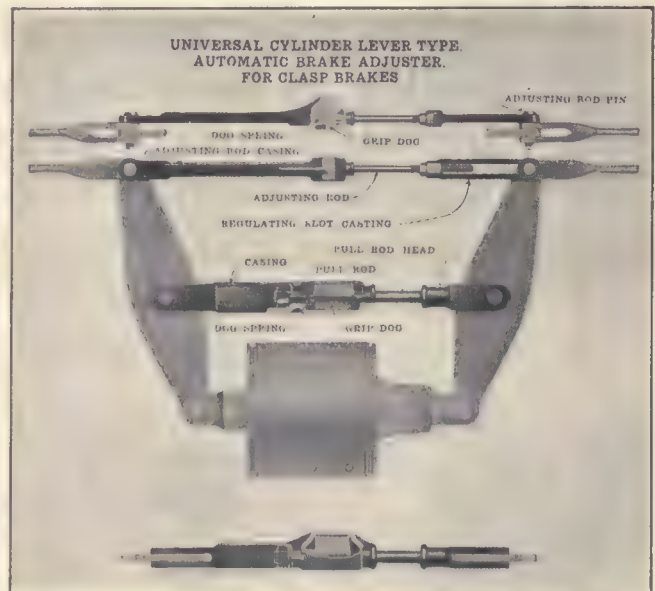
This adjuster takes the place of the turnbuckle, or bottom rod connection, found on most trucks, or tie rod connection on the cylinder levers.

Owing to its simplicity, the Universal Slack Adjuster is practically "fool-proof," and may be installed and maintained by ordinary labor. There is no likelihood of its getting out of order, and it may be depended upon to perform its work day after day, in a satisfactory and profitable manner.

The Universal Brake Slack Adjuster automatically adjusts the piston travel when used with either hand or air brakes.

This device is the simplest and most efficient Brake Slack Adjuster possible to devise. It will give perfect satisfaction wherever installed.

Write us your wants, and we will be glad to send complete data.



## Gould Coupler Company

Offices: New York and Chicago. Works: Depew, N. Y.



*Largest Manufacturers of Commercial Motor Vehicles in America*



White 1½-2-ton Tower Truck, one of the fifteen White Trucks owned by the Georgia Railway & Power Company

## WHITE TRUCKS

**I**N building motor trucks it is the policy of The White Company to make them the highest grade at whatever cost. This policy is founded on the conviction that nothing less sturdy, or less refined, or less expensive can efficiently and economically meet the actual requirements of motor truck service.

*White Trucks are built in capacities ranging from 1500 pounds to 5 tons. Send for special folder describing White Trucks in Electric Railway Service.*



**THE WHITE COMPANY**  
CLEVELAND

*Awarded the ONLY GRAND PRIZE for Motor Trucks at the Panama-Pacific International Exposition, San Francisco*



# SAMSON



# SPLICERS

## "Lowest Cost per CAR MILE"

This is the reason no wise road ever changes from *Samsons*. Once introduced on any property the unique service that *Samsons* give brings them forcibly and favorably to the line superintendent's and purchasing agent's attention. You needn't buy *Samsons* so often—and *they stay up*.

*Samson* splicers are non-arc-ing. They do not form hard spots in trolley. Strength is provided in excess of new wire. *Samsons* stay upright in the span.

*Samson* design is an evolution, through constant study of splicers under actual operation. They represent the last word in splicer efficiency.

For "Service Efficiency" in any overhead material specify "Drew." Catalogue for reference sent free on request. Ask for it.

### Drew Electric & Mfg. Co.

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MEANS "SERVICE EFFICIENCY"





## For Every Electric Railway Need: a Barrett, Duff, or Duff-Bethlehem Jack

Quick-acting jacks for light work—powerful hydraulic jacks for heavy lifts—and

### Barrett Emergency Car Jacks

to keep the cars running out on the line and promote public good-will. On the Bay State, Philadelphia Rapid Transit, Pittsburgh Railways and many other systems, a Barrett Jack is considered just as essential to the complete equipment of every car, as the controller. These roads *know*—their experience has proven the value of Barrett Jacks. Why not take advantage of this experience?

The Barrett Catalogs are waiting for you—write!

**Largest Manufacturers of  
Lifting Jacks in the World**

**THE DUFF MFG. CO.**

Established 1883

**PITTSBURGH, PA.**

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Barrett  
"Bay State"  
Emergency  
Car Jack  
No. 239

*15 Tons Capacity  
Single Acting*







# Columbia Tools on the Job for You!

## Turning out Bearings



You will understand the perfection of Columbia-made products when we tell you that we have several hundred machine tools alone.

Practically each tool, be it drill, shaper, borer, grinder, planer or lathe,

is handled by the same man day in, day out.

Such specification inevitably results in turning out the best possible work.

That's only one of many reasons for using Columbia-made products.

### TOOLS

Armature and axle straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

### CAR EQUIPMENT

Armature and field coils  
Brush-holders and springs  
Brake, door and other handles  
Brake forgings, rigging, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or mall. iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel)  
Trolley wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.





# What the Committee on Fares and Transfers Said in the Report to the 1916 Convention about

## MOTOR-DRIVEN STATION REGISTERS

"Wherever it is possible to eliminate the use of tickets at such points (prepayment areas) it should be done;

"And the collection of fares should be accomplished in the way that would make the most direct route for the cash fare from the hands of the passenger to the treasurer's office.

"In other words, it is felt that the most efficient way of collecting fares at prepayment areas is by means of a motor-driven fare box.

"This (the motor-driven fare box) eliminates all the opportunity for abuse of the ticket system by collusion between employes selling tickets and those receiving them at ticket chopper.

"The number of change-makers in any case does not equal the number of persons who would be required to sell tickets.

"Passengers very quickly acquire the habit of having the exact fare ready."

The practices recommended by the Committee are obtainable only with the International Motor-Driven Station Register, which is making the Ticket Chopper obsolete. It's the ideal Collection System for Rapid Transit Lines, Trolley Terminals, Ferries and Parks.

### THE INTERNATIONAL REGISTER COMPANY

15 South Throop Street, Chicago, Ill.

Manufacturers of Coin Registers, Fare Boxes, Double and Single Car Registers and Fittings, Conductors' Punches and exclusive agents for Heeren Enamel Badges.

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# Hale & Kilburn

## Drawn Steel Pedestal Bases

Pressed steel seat framing originated by Hale & Kilburn ten years ago is now common practice, but Hale & Kilburn still lead in the quality and design of pressed steel parts.

A typical proof is afforded by examining the Hale & Kilburn oval base for seat pedestals—the only base

### *Drawn from Flat Sheet*

and without any seam or weld at side. This single feature, obtained at a cost of many thousands of dollars, but without adding to the price of Hale & Kilburn seats, assures:

- Absolutely true and neat outlines.
- Maximum strength for minimum weight.
- Prevention of dust accumulation and easier cleaning of the floor beneath.
- Avoidance of weaknesses due to defective welding.
- No obstruction to underseat baggage due to shape of pedestal.

There are many other examples of Hale & Kilburn superiority. Ask us about them.



## Hale & Kilburn Co.

Philadelphia New York Chicago  
Washington San Francisco





Brooklyn New York Chicago  
 Buffalo Montreal Quebec Baltimore  
 San Antonio Jackson Richmond Albany Reading  
 Omaha Dallas Newark Altoona  
 Fargo

# H B Life Guards

# Every Where

# Providence Fenders

Cuba Colombia  
 India Panama Australia Cape Colony  
 Japan Italy China  
 England Greece Portugal Cuba  
 Brazil

THE CONSOLIDATED CAR FENDER CO.

PROVIDENCE, R. I.

General Sales Agents,

WENDELL & MAC DUFFIE CO.

61 Broadway, N. Y.





Worn clean through—  
but first gave  
22,000 miles' service

Run 15,900 miles—  
and still good  
for more

## Miller Trolley Shoes

on the Trail

### of the Liberty Bell

Every car on the famous "Liberty Bell" high-speed route (Philadelphia-Allentown) of the Lehigh Valley Transit Company is equipped with Miller Sliding Trolley Shoes.

The wear pieces alone are averaging 9731 miles, whereas the best 6-in. brass trolley wheels often lasted only a day covering 185 miles!

Note the shoe that was allowed to run until worn clean through—22,000 miles!

Note the other which ran 15,900 miles and was still good for more!

### Why Do They Beat the Wheel?

Because they cling to the wire better with 24 lb. tension than the wheels did with 40 lb. tension.

The Miller shoe doesn't arc out; it wears out after giving thousands of miles. Even then the sides are good for several times the life of the contact piece alone.

Do you realize, too, that the Miller Shoe needs no oiling?

And that Lehigh Valley Transit micrometer measurements have shown practically no wear in overhead wire during the year they have had these shoes in service?

Better order some Miller shoes for your lines. No change in your pole and base standards necessary except the reduction of tension.

## Miller Trolley Shoe Company

53 State Street

Boston, Mass.

Holden & White, Chicago.

W. F. McKenney, Portland, Oregon.

F. F. Bodler, San Francisco, Cal.

#### Sales Representatives

W. M. McClintock, St. Paul, Minn.

Chas. F. Saenger & Co., Cleveland, Ohio.

S. I. Waller, Los Angeles, Cal.

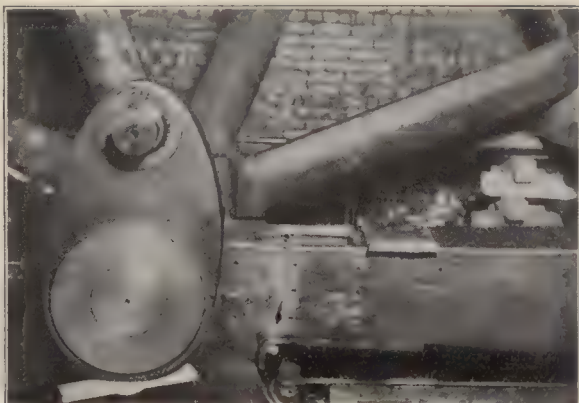
Alfred Connor, Denver, Col.

T. C. White & Co., St. Louis, Mo.

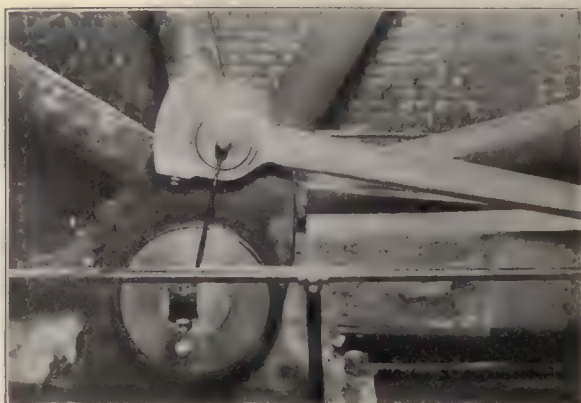




# Oxy-Acetylene Welding and Cutting



Original fracture, before welding. Note piece cut out to weld hollow frame.



Appearance of repair after weld had been made, and engine put back in service.

## Stationary Engine Repair in Power Plant Demonstrates Adaptability of the

# *Prest-O-Lite* PROCESS

The main frame of this 300 h.p. Corliss engine cracked. As a makeshift repair, it was strapped with plates but, running at half load, the crack opened about 1/32 of an inch at each impulse, resulting in an important loss of power. When additional power was needed, a perfect repair, or replacement, was imperative.

By welding, the frame was made good as new at a cost of about \$200, yet representing a substantial saving, as a new frame of this design would have been very costly, to say nothing of the expensive delay and dismantling. The work took 23 hours, and the engine was out of commission for only 48 hours. The engine is now in service, giving perfect satisfaction.

Ability to make important repairs "on the spot" often more than pays for equipment, to say nothing of the tremendous advantage in being able to make shop repairs on broken or worn parts, thus reclaiming much valuable material from the junk pile. Both as a preparedness measure and as a routine process, Prest-O-Lite oxy-acetylene welding Process more than pays its way.

The Prest-O-Lite Process employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene is backed by Prest-O-Lite Service, which provides dry, purified gas, insuring better welds, quicker work, at lower cost.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for \$60 (Canada, \$75); acetylene service, and metal cutting blow-pipe at additional cost.

*Get our illustrated literature showing oxy-acetylene savings that other electric roads are making. Ask for details of Prest-O-Lite Gas-Weld Rail Bonding, which provides greater conductivity and longer life, at less cost per bond.*

## The Prest-O-Lite Company, Inc.

*The World's Largest Makers of Dissolved Acetylene*

U. S. Main Office and Factory  
805 Speedway, Indianapolis

Canadian Main Office and Factory  
Merritton, Ont.

**Do Your Next Bonding by the Prest-O-Lite Process**





# V-K

## NON-ARCING — HARP —



A—Bronze Lock Nut. B—Hollow Steel Case-Hardened Lubricating Shaft. C—Cotter Pin. D—Rivets. E—Steel Adjustment Screws (Right and Left). F—Bronze Contact Spring. H—Cotter Pin Hole. K—Expanding and Contracting Slot.

**T**HE V-K NON-ARCING HARP insures perfect contacts and entire freedom from interruptions of current to the pole. Its distinctive device (patented) for locking the axle pin provides and maintains a rigid bearing for the wheel, prevents wear and arcing around the pin-hole and gives longer life to the whole equipment.

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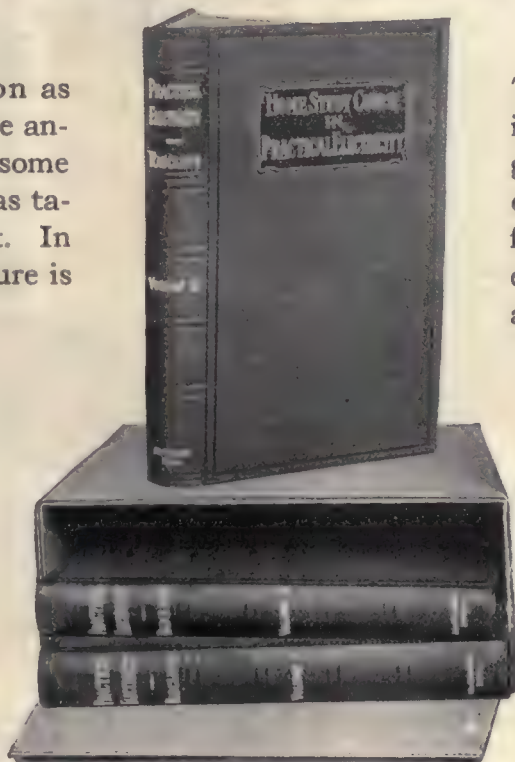
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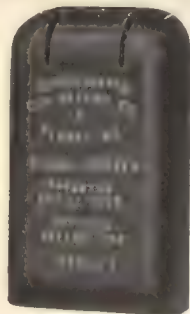
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Rot is one of the mighty forces that is always working to the detriment of the maintenance engineer and the company's earnings. Sometimes it's called corrosion, or electrolysis—but with wood it's plain r-o-t.

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Will mitigate the effects of rot in poles, cross-arms, ties, and all kinds of construction timber.

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THE EASY WAY TO PREVENT DECAY



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This remarkable improvement in trolley line suspension has a high-grade porcelain body, protected by a sherardized yoke and supporting the trolley ear by a forged steel, sherardized hanger bolt. Bronze bolt can be used if preferred.

It is durable, safe, easily installed, and low in cost.

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Exhibits of the efficiency, economy and satisfaction of this apparatus for all welding and cutting work are being made every day of the year in its service in the shops and on the tracks of many electric railways. The records of its value in such work are at your service.



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# TYPICAL I-T-E CIRCUIT BREAKER INSTALLATIONS

Every consulting and operating engineer should secure a copy of this book.

Quite aside from its general interest, the number of important interurban and street railway switchboards shown and described can not fail to be of interest, while the descriptions of the circuit breakers for special purposes will be stimulating and suggestive to those responsible for the successful operation of large installations.

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—and watch your unit costs decrease. The quality of finish is improved, too—for the

## "SPRACO" PAINT GUN

applies paint, varnish or lacquer far more evenly than the work can be done with the brush.

It is particularly useful for painting irregular or inaccessible work such as trucks, brake rigging, fenders, etc., as well as the highly-finished surfaces of car-bodies.

There are adjustments for flow of paints and pressure of air, to meet conditions in any class of work—the gun itself weighs a trifle over a pound.

Ask us to show you how the "Spraco" Paint Gun will help you cut your paint shop costs.



It applies the paint in a jiffy—evenly—wastelessly

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**\$150 DOWN TO \$19**

*Excerpts from article on "Oxy-Acetylene Cutting Practice," by B. P. Legare, Engineer Maintenance of Way, United Railroads of San Francisco, which appeared in July 15th issue of Electric Railway Journal.*

"An apparatus which has proved to be a very valuable addition to our engineering equipment."

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in railway maintenance work. It is almost indispensable to efficiency and economy. It can render great service in your shop, yards, scrap pile, repair and emergency work.

Let us give you an idea of the wide range of usefulness of an Oxweld Outfit. Send to-day for Bulletin Series No. 700.

**Oxweld Acetylene Co.**  
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Largest Makers of Welding and Cutting Equipment  
and Supplies in the World



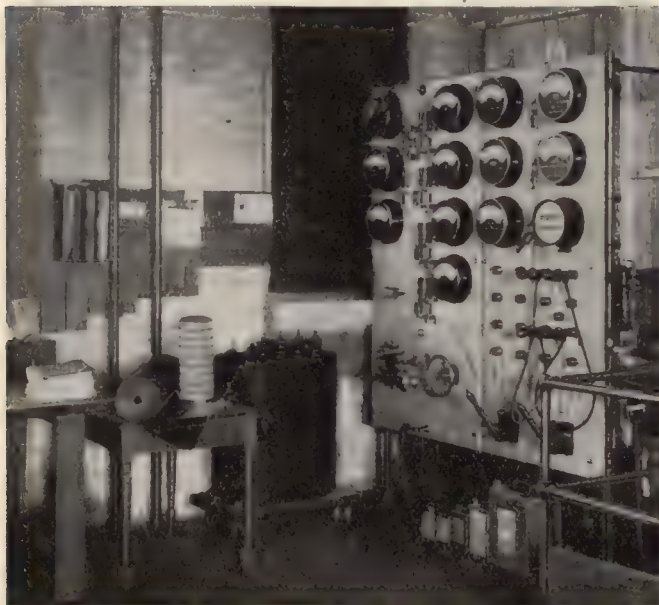
Oxweld Welding Unit Portable. All sizes of plants to meet any conditions



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are in every case considerably more severe than any service conditions to which the materials can be subjected. Our testing laboratories are thoroughly equipped for testing dielectric strength, ageing qualities, etc., and every bit of



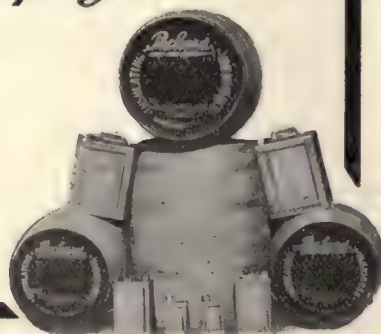
Packard insulation must live up to the established Packard standard of quality. That's why Packard Varnishes, Impregnating Compounds, Varnished Tape, Insulating Cloth, etc., have never been known to break down in service.

**We couldn't buy them good enough for our purposes so we make them.**

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and all other material  
for the electrical railway

Our electrical supplies are all  
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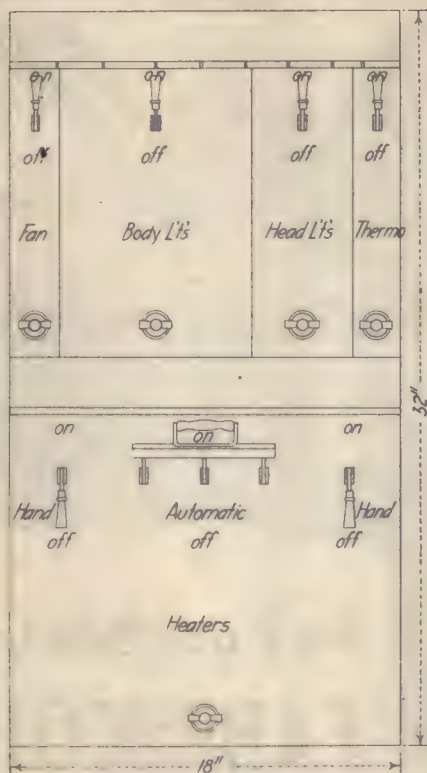
Let our nearest house quote  
you on your electrical needs

## *Western Electric Company* INCORPORATED

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**EQUIPMENT FOR EVERY ELECTRICAL NEED**  
Member Society for Electrical Development. "Do it Electrically"





**Krantz Safety Switch Panel  
for High-speed Car.  
Note Its Modest Dimensions.**

## Specify Krantz Safety Switch Panels

Safety

Compactness

Service

Krantz Safety Switch panels for railway voltages, already installed in hundreds by the New York Municipal Railway Corporation, Interborough Rapid Transit Company and others for station service, are also available for

### MODERN CAR PANEL BOARDS

Don't scatter auxiliary circuit switches throughout the car when you can concentrate them at the most convenient place, using a fireproof panel box and Krantz Safety Car Switches instead of exposed knife switches.

Krantz Safety Car Switches are not only more compact and more reliable than knife switches, but are also 100 per cent efficient and safe no matter how careless and inexperienced the operator may be.

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These switches are installed as isolated units.

They have perfect scraping brush contact.

They leave no live parts exposed when taken out of the compartment.

They act with a snap, due to their toggle-joint construction.

The fuses cannot blow while exposed.

The fuses cannot be removed while current is on.

The switches have magnetic blow-outs for capacities exceeding 10 amp. and are also isolated from the adjacent switches.

*We invite requests for data and proposals*

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160 Seventh Street, Brooklyn, N. Y.

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**Copy Changes.** If no proofs are desired your advertisements should be in our hands Wednesday of the week preceding date of publication, otherwise your latest advertisement in accordance with schedule will be repeated.

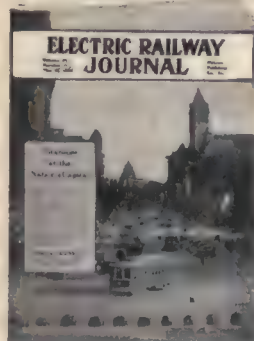
**New Advertisements** (not changes of copy) can usually be accepted up to noon Wednesday of the week of publication, but no guarantee can be given as to location or proofs or indexing.

**Searchlight Advertisements** (Proposals, Wants, For Sale, etc.) received as late as 10 A. M. Thursday will be published if there is space available in the pages that go to press last. The paper is dated and mailed Saturday.

**THESE** are not arbitrary rules. We do our best to give our advertisers what they want—work overtime if necessary—but each advertising form has to be on the press at a specified time. That is why we cannot guarantee proof or location unless we have copy on time. We want our advertising space to work at maximum efficiency for our advertisers.

**The Paper is dated and mailed Saturday**

**Electric Railway Journal, 239 W. 39th St., New York**





## The Tight True Joints of J-M Fibre Conduit Guard Lead Sheaths Against Electrolysis

You can't have a battery without an electrolyte, nor electrolysis without seepage—and this of course leads straight to a discussion of joints, where underground conduit is concerned.

The plain butt joint characteristic of other types of ducts, made up with burlap and cement, can obviously never compete in tightness with a tool-finished and perfectly fitting socket joint formed by an unerring machine. Nor is wall leakage to be feared when you use J-M Fibre Conduit, for the material itself is water-proof through and through. Seepage is eliminated, both at joints and through the walls.

This is but one of the many reasons for the increasing use of J-M Fibre Conduit. The nearest J-M Branch Electrical Department has complete information for you.



*Serves more people in more ways than any  
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—because Fabrikoid has certain qualities possessed by no other seating material. It does not harbor dust, dirt or germs—can be washed—has a distinctive toughness and endurance that enable it to stand up under the hardest service.

—because it fills leather's place at a fraction of leather's cost—yet gives service that leather cannot give.

—because it has all leather's richness and color and texture, yet will **not** crack or peel or split.

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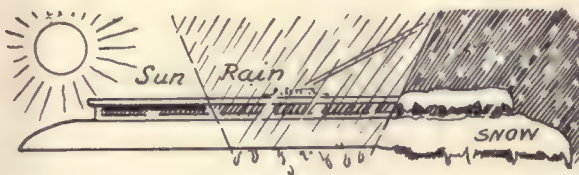


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don't you use a car roofing that will be just as effective under rain or snow? Why don't you use



## BAYONNE CAR ROOFING

This roofing affords real protection against all weather elements, as against the fading caused by sunshine. It is a self-contained product which requires no treatment by you or the car builder. It is made of specially prepared canvas upon which dampness, snow, oil, dirt and the hot rays of the sun have little effect.

It adds life to the car and cuts maintenance

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It comes in three weights, yellow and brown, widths from 22 in. to 120 in. and it comes from one of the largest and most reliable car fabric houses in the business. Write for literature and samples.

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owe some of their efficiency to the thought, energy and resourcefulness of manufacturers who supply the means for such achievements.

These men know how important it is for them to keep in touch with the manufacturers.

In the electric railway industry, such men find the easy, certain and thorough way to keep in touch with manufacturers is through the advertising pages of the

**Electric Railway Journal**

239 West 39th Street

New York

## CONTROLLER PARTS

Our new bulletin on controller parts is new ready. We make all types and designs and can ship promptly. Special parts made to order.

We also have ready bulletins on trolley wheels and line material. Ask for them.

**The Eureka Company**  
North East Pennsylvania

We also manufacture—Commutators, Commutator Bars, Brush Holders, Copper Leaf and Gauze Brushes, Bearings and Bushings, Soldering Coppers, Copper Hammers, Drop Forgings, Copper, Bronze and Brass Castings.





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Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

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when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



There's no need to use an extra new fuse every time one blows when the *efficient and safe* Economy fuse can be renewed over and over again with our *tested* Renewal Links at a saving of 80% of fuse maintenance expense under old-style, wasteful methods.

Write now for Bulletin No. 17 and our catalog.

**Economy Fuse & Mfg. Co.**  
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Invented and made exclusively by the McQuay-Norris Manufacturing Co. of St. Louis. The *Leak-Proof* design can not be copied—*Leak-Proof* service can not be duplicated—*Leak-Proof* durability can not be equalled by any other make of piston ring.

A set of *Leak-Proof* Piston Rings free for any test. Write Dept. L.



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Canadian Factory: W. H. Banfield & Sons  
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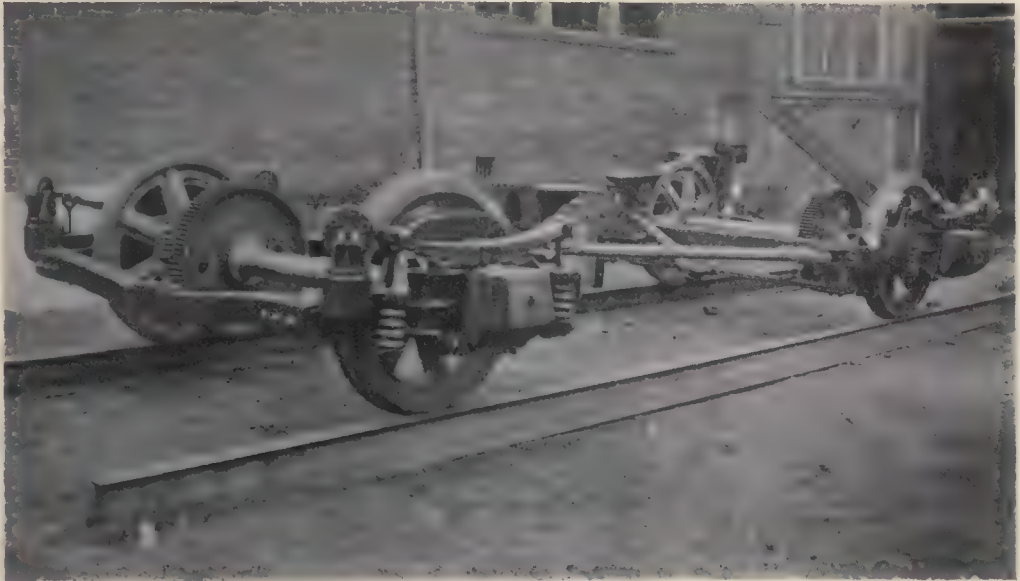
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*PARTICULARS GLADLY FURNISHED*

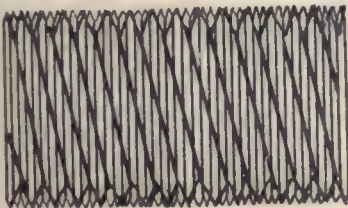
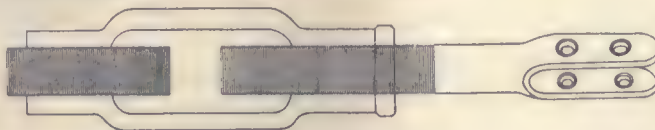
**Philadelphia Holding Co.,** <sup>505</sup> Chestnut St., **Philadelphia**

## The Accident That "Can Never Happen"

—but does—is almost always caused by some minor defect. Make all the pivot-points in the brake-rigging of your cars accident-proof by installing

## Boyerized Pins

They are protected against wear by a tough, glass-hard layer of case-hardening—good for years of service without replacement.



Note the Difference Between Old Thread and New!

## The New Bemis Fine-Thread Turn Buckle

has more than twice as many threads as the ordinary type—this assures finer adjustment, minimum wear, and greater strength of rod of equal diameter. Once the lock-nuts are jammed, they do stay tight.

**Bemis Car Truck Company, Springfield, Mass.**



The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

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STEEL WORKS CO.**

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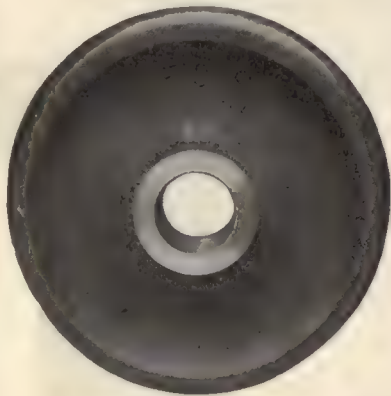
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WHEELS**



Every wheel is given extreme care in manufacture and inspection.

Their use on electric railways throughout the country demonstrates their superior qualities.

Service tests have shown that there is a saving of 25 per cent in brake shoe consumption by the use of chilled iron wheels.

We are prepared to furnish F. C. S. wheels made for your particular conditions.

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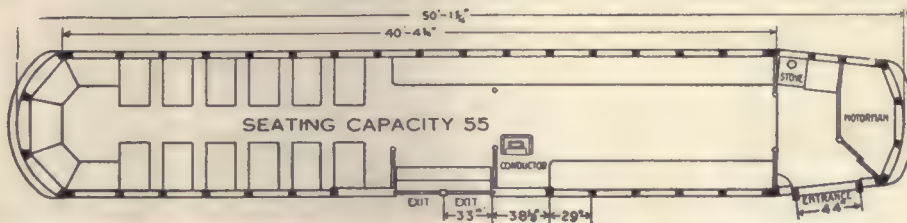
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# The Car Rider's Car



**I**N the average prepayment car not more than ten unpaid fares can be crowded on the loading platform. In other words, in order to close his doors and give his motorman a go-ahead signal the conductor must have admitted to the car all incoming passengers but ten. The time lost at heavy transfer points or at any other big loading point readily may be seen. This is done away with in "The Car Rider's Car." Under the arrange-

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**PETER WITT, 630 Leader Building, CLEVELAND**

Recent shipment of semi-steel trailer cars for Salt Lake & Ogden Railway

**THE JEWETT CAR COMPANY**

Newark, Ohio





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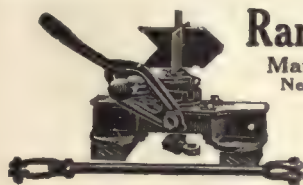
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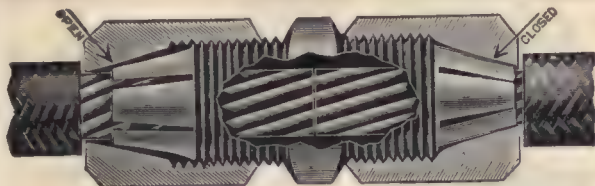
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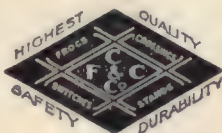
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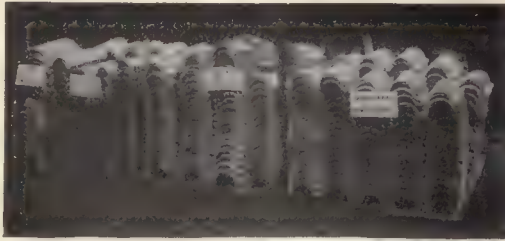
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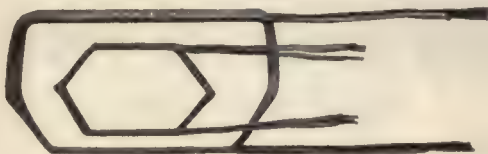
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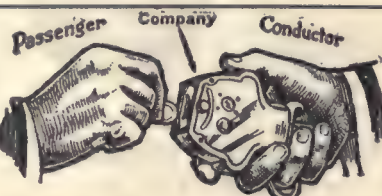
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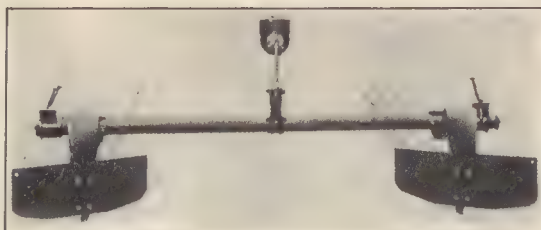
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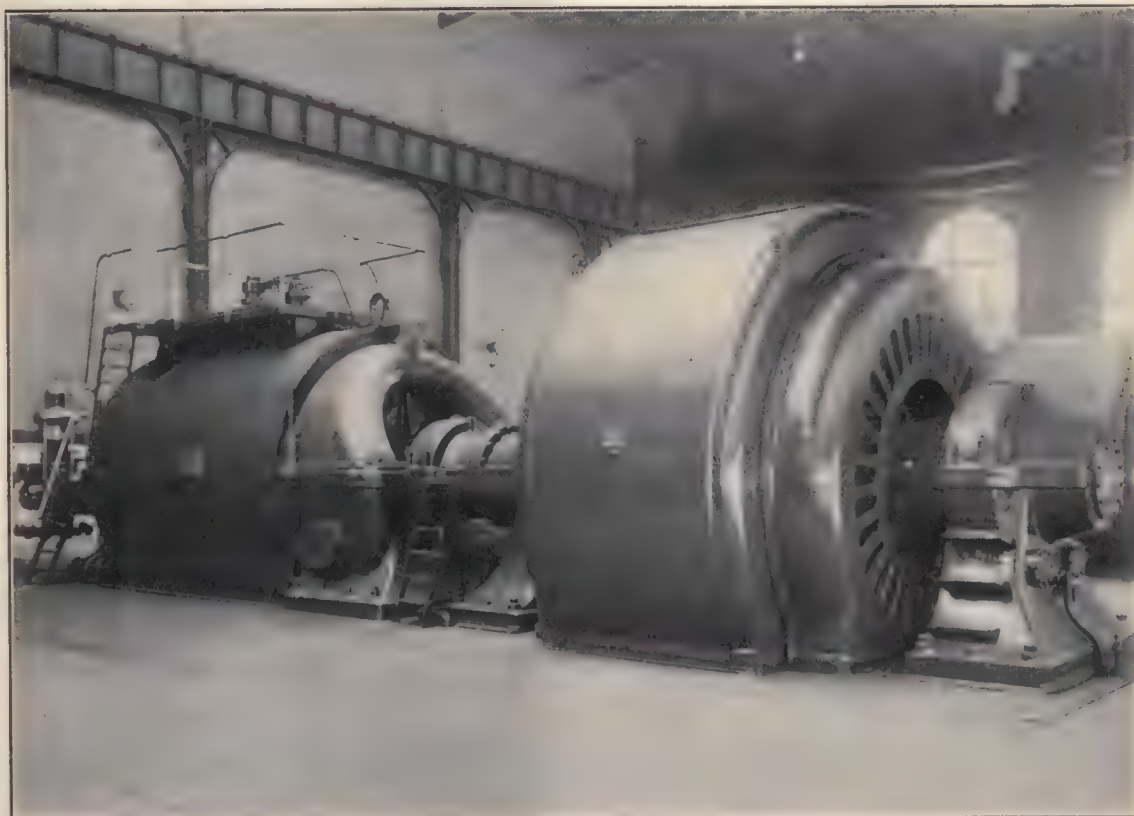
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### Generator Units and Steam Engines

Two Fischer Generating Units, each unit consisting of one 18" x 18" single cylinder, four valve, outside crank, self-oiling, automatic Fischer Engine, direct connected to a Westinghouse Electric & Manufacturing Co.'s generator. Generator 150 K.W., 250 volts, D.C., speed 250 R.P.M., together with one switchboard complete with instruments and switches.

Also one L. H. Wetherill Corliss Engine, 20" x 48", Band Wheel, 14' diameter, 26 1/2" face, cast in halves.

Also one Providence Steam Engine Works, Green-Corliss Engine, R.H. Cylinder 26" x 48", wheel 21' diameter, cast in 8 segments, bolted together, rim 15" x 14".

Above equipment is in first class condition. If interested have your representative call at our works and submit us with separate price on each item after examining same.

**The Wilmington Steel Company**  
Wilmington, Delaware

## FOR SALE

### Wheel Lathe For Sale

Niles Lathe, 52" swing, 2 heads, motor drive, modern and in fine shape. Sell at a bargain. L. Brenner & Co., Lebanon, Pa.

### A Metal Opportunity

Take advantage of the high prices of metal. We are cash buyers of all grades of scrap metal. Our specialty is buying electric plants, storage battery plants, storage battery plates and sediment. We buy small lots as well as large lots. Write us and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Co., 30-31 India Wharf, Boston, Mass.

### Our Prices Will Interest You

Two 25 kw., 250 v., 100 amp., 300 r.p.m. D.C. Westinghouse generators, connected to 9 x 11 Westinghouse engine.  
Four panel switchboards with two direct Thomson retorting wattmeters.  
Two Weston ammeters—two Weston oval meters with necessary switches.  
Two small combination compressed switchboards.  
Two 1/4 kw. D.C. generators for producing sparks driven by belt on main shaft.  
One Gould 4 x 5 power pump No. 315 with compressed air tanks, used for starting engine, pumps are belt driven by 1 1/4 hp. Westinghouse electric motor, serial No. 368683.  
This machinery has been used a very short while and is practically new, best cash offer takes it. Must be removed at once. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

## CAR BARGAINS

IN

### Flat, Gondola, Box

Stock, Log, Ore, Street,  
Rail, Quarry, Refrigerator

### Tank, Dump, Passenger

ARE SHOWN IN

## ZELNICKER IN ST. LOUIS

40 page bulletin No. 207

Get it before buying or selling

Rails, Locomotives, Equipment, Machinery

## Get your Wants into the Searchlight

### ADVERTISING RATES

Positions Wanted, Evening Work Wanted, 2 cents a word, minimum charge 50 cents an insertion, payable in advance.

Positions Vacant, Salesmen Wanted, Agencies, all undisplayed Miscellaneous ads, Machinery and Plants For Sale (with outline of display heading), 3 cents a word, minimum charge \$1.50 an insertion.

All advertisements for bids cost \$2.40 an inch.

Advertisements in display type cost as follows for single insertions:

1-16 page, \$5.00	1 in. single col., \$3.00
1-8 page, 10.00	4 in. single col., 11.60
1-4 page, 20.00	8 in. single col., 22.40

In replying to advertisements, send copies of testimonials, etc., instead of originals.

## MISCELLANEOUS WANTS

### Locomotive Wanted

One Locomotive of approximately 50 tons weight and equipped with four 75 hp. motors. State age, mileage performed, type of equipment and general specifications. Box 1206, Elec. Ry. Jour.

### Wanted to Buy

From owners one light single truck enclosed trolley car, double end, 18' to 22' over posts, used, complete, 30 hp. motors. Give price on body alone for Peckham No. 9 A. truck also. Address "H.," Box 424, Oklahoma City, Oklahoma, Capital Traction Company.

## POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

DRAFTSMAN, 23, electrical and mechanical designing. Six years' experience, technical training. At present employed. J. S., 344 Tompkins Place, Glendale, L. I.

GENERAL superintendent and chief engineer construction and operation, city and interurban, double and single track, is open for engagement. Twelve years' experience. Can furnish excellent references and testimonials. Will locate anywhere. Address Box 1212, Elec. Ry. Jour.

## POSITIONS WANTED

ELECTRICAL and mechanical engineer. Technical graduate. Thirteen years practical work in railway and industrial engineering. Thorough practical experience in maintenance and construction of power-houses, sub-stations, transmission lines, shops, rolling stock and lighting systems. Executive training in handling men and the purchase of material and supplies. Clean record. Temperate habits. At liberty about January 1st. Box 1207, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

GRADUATE engineer wishes position as engineer of maintenance of way with electric railway company. Twelve years' experience on city and interurban lines. Now employed, desire change. Box 1214, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

STREET railway superintendent with years of experience desires to make a change. Thoroughly understands all branches of the work. Box 1215, Elec. Ry. Jour.

WANTED—position as superintendent or assistant to executive of an Electric Railway. Familiar with both city and interurban operation and have some knowledge of lighting. References present and past employers. Age 31. Box 1219, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

## POSITIONS VACANT

CHIEF engineer for Power Station of large Interurban Railway in Central States. Responsible position which demands experienced engineer who can operate economically. Give experience, references and wages expected. Box 1213, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

DRAFTSMAN wanted for heavy power plant designing work, in city near Chicago. State age, experience and salary expected. Box 1216, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER—engineer electric street railway in South America—must have experience in street railroad management and thorough knowledge of Spanish. Box 1217, Elec. Ry. Jour.

TRACK foreman for small street railway property in Southeast Texas. State experience and salary expected. Box 1209, Elec. Ry. Jour., 501 Rialto Bldg., San Francisco, Cal.



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.  
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

## Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

### Acetylene Service.

Davis-Bournonville Co.  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc., The.

### Advertising, Street Car.

Collier, Inc., Barron G.

### Air Cleaners.

Lord Mfg. Co.

### Alloys, Steel & Iron.

Titanium Alloy Mfg. Co.

### Alloys, and Bearing Metals. (See Bearings and Bearing Metals.)

### Anchor, Guy.

Electric Service Supplies Co.  
Holden & White.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

### Anti-Climbers.

Railway Improvement Co.

### Automobiles and Busses.

Brill Co., The J. G.

### Axle Straighteners.

Columbia M. W. & M. I. Co.

### Axles.

Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
U. S. Metal and Mfg. Co.  
Westinghouse Elec. & M. Co.

### Babbitting Devices.

Columbia M. W. & M. I. Co.

### Badges and Buttons.

Electric Service Supplies Co.  
International Register Co.  
Western Electric Co.

### Bankers and Brokers.

National City Co.  
Redmond & Co.

### Batteries, Dry.

Johns-Manville Co., H. W.  
Western Electric Co.

### Batteries, Storage.

Electric Storage Battery Co.  
Western Electric Co.

### Bearings, Center.

Baldwin Locomotive Works.  
Holden & White.

### Bearings and Bearing Metals.

Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
More-Jones Brass & M. Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

### Bearings, Oilers, Graphite

Bronze and Wood.  
Bound Brook Oil-less Bearing Co.

### Bearings, Roller and Ball.

Gurney Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.

### Bearings, Roller Side.

Holden & White.

### Bells and Gongs.

Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

### Benders, Rail.

Niles-Bement-Pond Co.

### Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

### Blowers.

General Electric Co.  
Westinghouse Elec. & M. Co.

### Boiler Cleaning Compounds.

Dearborn Chemical Co.

### Boiler Coverings.

Johns-Manville Co., H. W.

### Boiler Graphite.

Dixon Crucible Co., Joseph.

### Boilers.

Babcock & Wilcox Co.

### Bond Clips.

Electric Railway Improve. Co.

### Bond Testers.

American Steel & Wire Co.  
Roller-Smith Co.

### Bonding Apparatus.

Davis-Bournonville Co.  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc., The.

### Bonding Tools.

American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

### Bonds, Rail.

American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Roebing's Sons Co., John A.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

### Bonds, Welded.

Lincoln Bonding Co.

### Book Publishers.

McGraw-Hill Book Co., Inc.

### Boring Tools, Car Wheel.

Niles-Bement-Pond Co.

### Braces, Rail.

Kilby Frog & Switch Co.

### Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)

American Bridge Co.  
Bates Expanded Steel Truss Co.  
Electric Ry. Equipment Co.  
Electric Service Supplies Co.  
International Creos. & C. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

### Brake Adjusters.

Johns-Manville Co., H. W.  
Kerschner Co., Inc., W. R.  
Smith-Ward Brake Co.

### Brake Shoes.

American Brake S. & Fdy. Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

### Brakes, Brake Systems and Brake Parts.

Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Westinghouse Trac. Brake Co.

### Brazing. (See Welding.)

### Bridges & Buildings.

American Bridge Co.

### Brooms, Track, Steel or Rattan.

Paxson Co., J. W.  
Western Electric Co.

### Brushes, Carbon.

Dixon Crucible Co., Joseph.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

### Brush Holders.

Anderson Mfg. Co., A. & J. M.

### Bumpers, Car Seat.

Electric Service Supplies Co.

### Bunkers, Coal.

American Bridge Co.

### Bunting.

Boyle & Co., Inc., John.

### Bushings, Fibre.

Diamond State Fibre Co.

### Bushings, Graphite & Wooden.

Bound Brook Oil-less Bearing Co.

### Bushings, Case Hardened Mangane.

Bemis Car Truck Co.

### Buttons. (See Badges and Buttons.)

### Cables. (See Wires and Cables.)

### Carbon Brushes. (See Brushes, Carbon.)

### Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

### Car Stop, Automatic.

Consolidated Car-Heating Co.

### Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)

### Cars, Passenger, Freight, Express, etc.

American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
Wason Mfg. Co.  
Witt, Peter.

### Cars, Second Hand.

Kerschner Co., Inc., W. R.

### Cars, Self-Propelled.

Electric Storage Battery Co.  
General Electric Co.

### Cars, Dump.

Differential Car Co.

### Castings, Brass.

Frankel Connector Co.  
More-Jones Brass & M. Co.

### Castings, Composition or Copper.

Anderson M. Co., A. & J. M.

### Castings, Gray Iron and Steel.

American B. S. & Fdry. Co.  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
Standard Steel Works Co.  
Union Spring & Mfg. Co.

### Castings, Malleable and Brass.

American Brake S. & Fdry. Co.  
Bemis Car Truck Co.  
Long Co., E. G.  
St. Louis Car Co.

### Catchers and Retrievers, Trolley.

Electric Service Supplies Co.  
Eclipse Railway Supply Co.  
Holden & White.  
Kerschner Co., Inc., W. R.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Union Electric Co.  
Wood Co., C. N.

### Ceiling, Car.

Pantasote Co., The.

### Chargers, Storage Battery.

General Electric Co.

### Cheese Cloth.

Boyle & Co., Inc., John.

### Chemists.

Little, Arthur D., Inc.

### Circuit Breakers.

Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

### Clamps and Connectors, for Wires and Cables.

Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
Frankel Connector Co.  
General Electric Co.  
Klein & Sons, M.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

### Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)

Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Root Spring Scraper Co.  
Western Electric Co.

### Cleats, Car Wiring.

General Electric Co.

### Clusters and Sockets.

General Electric Co.

### Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

### Coasting Clocks.

Railway Improvement Co.

### Coil Banding and Winding Machines.

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
Western Electric Co.





—This  
Is  
False  
Economy

Old coils are old coils because of the insulation—not because of the copper. The copper is 100% pure—too high grade for casting purposes—too high priced to sell as scrap.

## Independent Treatment Is True Economy

It makes out of an old coil a new one of similar characteristics, but better in point of insulation. That is because Salamander Pine Asbestos is used—for asbestos insulated coils can be impregnated at a temperature that would destroy cotton insulated coils.

Independent Treatment includes our highly developed processes, modern appliances, and skilled labor—all at a trifling price—merely that of the actual insulation used.

Better write for our proposition today or send a few old coils for demonstration.

### Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York      FACTORIES: York, Pa., and Weehawken, N. J.

For General Testing  
in Electric Power Plants, or for Outdoor Work

# Weston

Model 45

## D. C. Portable Ammeters and Voltmeters

Designed to meet the demand for a medium-priced Ammeter and Voltmeter. Their accuracy is guaranteed within 1 per cent.

They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1/10 of a division at any part of the scale.

In mechanical and electrical workmanship the Weston Model 45 Portable Ammeters and Voltmeters practically attain perfection.

A full description will be found in Bulletin 501, which will be mailed to you on request.



### Weston Electrical Instrument Co.

21 Weston Ave., Newark, N. J.

New York	Chicago	Detroit	St. Louis	Montreal
Boston	Buffalo	Pittsburgh	Toronto	Florence
Philadelphia	Cleveland	Denver	Winnipeg	Paris
Richmond	Cincinnati	San Francisco	Vancouver	London

## THERE IS A VAN DORN COUPLER

for every condition and every requirement.

Send for information and blueprints.

VAN DORN COUPLER CO.,

2325 So. Paulina St. Chicago, Ill.



"Trade Mark Reg. U. S. Pat. Off."

### Samson Spot Waterproofed Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 SAMSON CORDAGE WORKS, BOSTON, MASS.

### ELECTRIC RAILWAY DEVICES

Rectifier for Frozen Air Pipes.  
High Power Compact Hand  
Brakes, Gear or Differ-

ential Light Types.  
Sterling Light Weight  
Roller Bearing Trolley  
Bases.

Screenless Air Cleaners  
for Compressors.  
Sterling Sand Boxes.  
Berg Fenders and Wheel  
Guards.



Multi-Vapo-Gap Lightning.  
Arresters and Hydrogrounds.  
Trigger Lock Reversible  
Controller Fingers.  
"Q-P" Trolley Catchers.  
Soldered Rail Bonds.  
Friction and Insulating  
Tapes.  
Sterling Ticket Punches.  
Controller Handles.

LORD MFG. CO.,  
105 W. 40th St., New York

## The Eclipse Railway Supply Co. CLEVELAND, OHIO

Manufacturers of the

ECLIPSE LIFE GUARD	ECLIPSE WHEELGUARD
ECLIPSE TROLLEY RETRIEVER	ACME FENDER

## U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY  
Chicago Washington, D. C.

## RAILWAY SUPPLIES

### SELLING AGENTS FOR

Tool Steel Gears and Pinions

Johnson Fare Box

Perry Side Bearings

Hartman Centering Center Plates

Wasson Trolley Bases

Garland Ventilator

Electric Arc Welders

High Class Railway Varnishes

and Enamels

Chillingworth Seamless Gear Cases

Special Agents for {  
Tool Steel Gear & Pinion Co.  
Johnson Fare Box Co.  
C. & C. Electric & Mfg. Co.  
Holden & White

General Agents for Anglo-American Varnish Co.

Eastern Agents for Union Fibre Co.

Southern and New England Agents for Thayer & Co.



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

## Coils, Armature and Field.

Cleveland Armature Works.  
Coil Mfg. & Repair Co.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Roebling's Sons Co., John A.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

## Coils, Choke and Kicking.

Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

## Coin-Counting Machines.

Electric Service Supplies Co.  
International Register Co.  
Johnson Fare Box Co.

## Commutator Slotters.

Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.  
Wood Co., C. N.

## Commutator Truing Devices.

General Electric Co.

## Commutators or Parts.

Cleveland Armature Works.  
Coil Mfg. & Repair Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Long Co., E. G.  
Westinghouse Elec. & M. Co.

## Compressors, Air.

General Electric Co.  
Westinghouse Trac. Brake Co.

## Condensers.

General Electric Co.  
Westinghouse Elec. & M. Co.

## Conduits, Underground.

Johns-Manville Co., H. W.  
Western Electric Co.

## Connectors, Solderless.

Frankel Connector Co.

## Controller Fingers.

Lord Mfg. Co.

## Controller Handles.

Lord Mfg. Co.

## Controller Regulators.

Electric Service Supplies Co.

## Controllers or Parts.

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Kerschner Co., Inc., W. R.  
Westinghouse Elec. & M. Co.

## Controlling Systems.

General Electric Co.  
Westinghouse Elec. & M. Co.

## Converters, Rotary.

General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

## Conveying and Hoisting Machinery.

American Bridge Co.  
Green Eng'g Co.

## Cooling Systems.

Spray Engineering Co.

## Cord, Bell, Trolley, Register, etc.

Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co.  
Long Co., E. G.  
Roebling's Sons Co., John A.  
Samson Cordage Works.

## Cord Connectors and Couplers.

Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., C. N.

## Cotton Duck.

Boyle & Co., Inc., John.

## Couplers, Car.

Brill Co., The J. G.  
Cincinnati Car Co.

## Long Co., E. G.

Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. Brake Co.

## Cranes. (See also Hoists.)

Niles-Bement-Pond Co.

## Crossing. (See Wood Preservatives.)

## Cross Arms. (See Brackets.)

## Crossing Foundations.

International Steel Tie Co.

## Crossing Signals. (See Signals, Crossing.)

## Crossings, Track. (See Track, Special Work.)

## Culverts.

American Rolling Mill Co.  
Bark River B. & Culvert Co.  
California Cor. Culvert Co.  
Canton Culvert & Slio Co.  
Coast Culvert & Flume Co.  
Corrugated Culvert Co.  
Delaware Metal Culvert Co.  
Dixie Culvert & Metal Co.  
Hardesty Mfg. Co., R.  
Illinois Corrugated Metal Co.  
Independence Co. Culvert Co.  
Iowa Pure Iron Culvert Co.  
Kentucky Culvert Mfg. Co.  
Lee-Arnett Co.  
Lone Star Culvert Co.  
Lyle Corrugated Culvert Co.  
Michigan Bridge & Pipe Co.  
Montana Culvert Co.  
Nebraska Culvert & Mfg. Co.  
Nevada Metal Mfg. Co.  
New England Metal Cul. Co.  
North East Metal Co.  
Northwestern Sheet & I. Wks.  
O'Neill Co., W. Q.  
Ohio Corrugated Culvert Co.  
Pennsylvania Metal Cul. Co.  
Road Supply & Metal Co.  
Sioux Falls Metal Cul. Co.  
Spencer, J. N.  
Spokane Corr. Cul. Co.  
Tennessee Metal Culvert Co.  
Utah Corr. Culvert & Flume Co.  
Virginia Metal & Culvert Co.  
Western Metal Mfg. Co.  
Wyatt Mfg. Co.

## Curtains and Curtain Fixtures.

Brill Co., The J. G.  
Du Pont Fabrikoid Co.  
Electric Service Supplies Co.  
Hartshorn Company, Stewart.  
Pantasote Co., The.  
St. Louis Car Co.

## Cutting Apparatus, Oxy-Acetylene.

Davis-Bournonville Co.  
Oxweld Acetylene Co.  
Prest-O-Lite Co., The.

## Derailing Devices.

Cleveland Frog & Crossing Co.

## Destination Signs.

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Western Electric Co.

## Detective Service.

Wisch Service, P. Edward.

## Dispatching Systems.

Simmens Auto Ry. Sig. Co.  
Western Electric Co.

## Doors, Asbestos.

Johns-Manville Co., H. W.

## Door Operating Devices.

Consolidated Car-Heating Co.  
National Pneumatic Co.

## Doors and Door Fixtures.

Brill Co., The J. G.  
Hale & Kilburn Co.  
National Pneumatic Co.

## Doors, Folding Vestibule.

National Pneumatic Co.

## Draft Rigging. (See Couplers, Car.)

## Drills, Track.

American Steel & Wire Co.  
Electric Service Supplies Co.  
Long Co., E. G.  
Ohio Brass Co.

## Dryers, Sand.

Electric Service Supplies Co.  
Zelnicker Company, W. A.

## Engineers, Consulting, Contracting and Operating.

Archbold-Brady Co.  
Arnold Co., The.  
Burch, Edward P.  
Byllesby & Co., H. M.  
Ford, Bacon & Davis.  
Gulick-Henderson Co.  
Hunt & Co., Robert W.  
Jackson, D. C. & Wm. B.  
Little, Arthur D., Inc.  
Richey, Albert S.  
Roosevelt & Thompson.  
Sanderson & Porter.  
Scotfield Engineering Co.  
Stone & Webster Eng'g Corp.  
Westinghouse Church Kerr & Co.  
White Companies, The J. G.  
Woodmansee & Davidson, Inc.

## Engines, Gas and Oil.

Westinghouse Elec. & M. Co.

## Engines, Steam.

Westinghouse Elec. & M. Co.

## Fare Boxes.

Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
Johnson Fare Box Co.

## Fences, Woven Wire, and Fence Posts.

American Steel & Wire Co.

## Fencing, Wire.

American Steel & Wire Co.  
Page Woven Wire Fence Co.

## Fenders and Wheel Guards.

Brill Co., The J. G.  
Cincinnati Car Co.  
Cleveland Fare Box Co.  
Consolidated Car Fender Co.  
Eclipse Railway Supply Co.  
Electric Service Supplies Co.  
Lord Mfg. Co.  
Root Spring Scraper Co.  
Star Brass Works.  
Western Electric Co.

## Fibre.

Diamond State Fibre Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.

## Fibre Tubing.

Diamond State Fibre Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.

## Fibre Insulation.

Johns-Manville Co., H. W.  
U. S. Metal & Mfg. Co.

## Field Coils. (See Coils.)

## Fire Extinguishing Apparatus.

Johns-Manville Co., H. W.

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- Wheel Guards. (See Fender and Wheel Guards.)**
- Wheels, Car, Cast Iron.**  
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Griffin Wheel Co.  
Long Co., E. G.
- Wheels, Car. (Steel and Steel Tired.)**  
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Internat'l Creos. & Con. Co.  
Linsley Bros. Co.  
Reeves Co., The.  
Valentine-Clark Co.



The advertisement features five tilted cards, each with the Gurney logo at the top and bottom. The cards are arranged around a central image of a ball bearing. The cards contain the following text:

- Top Card:**

Leading users of  
Ball Bearings  
Among American  
Manufacturers  
Use GURNEY  
BALL BEARINGS as  
STANDARD

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
JAMESTOWN, NEW YORK New York
- Top-Left Card:**

**Radio-Thrust  
Journal  
Boxes**

can be applied to stand-  
ard trucks without change.  
Ask for our designs.

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
JAMESTOWN, NEW YORK
- Top-Right Card:**

**RADIO-THRUST  
JOURNAL  
BOXES**

are made fool-proof. The  
ordinary, run-of-mind shop-  
man can neither put them on  
nor take them off in any way  
but the right way.

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
Chicago JAMESTOWN, NEW YORK New York
- Bottom-Left Card:**

**RADIO-THRUST  
JOURNAL  
BOXES**

are made specifically to meet  
the heavy thrusts which are  
met on the short-radius  
curves of electric railways.  
The bearings are designed so  
as to afford a thrust capacity  
of 100 per cent of the  
radial capacity.

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
Chicago JAMESTOWN, NEW YORK
- Bottom-Right Card:**

**RADIO-THRUST  
JOURNAL  
BOXES**

are made to MEET not  
OPPOSE your present  
axle and journal box  
standards. Send us a  
print so that we can  
prove this.

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
JAMESTOWN, NEW YORK New York
- Bottom Card:**

**RADIO-THRUST  
JOURNAL  
BOXES**

are so designed that they  
can carry a larger load than  
other bearings, because of  
the means for taking up  
thrust. Smaller bearings  
cost less money and mean  
easy adaptation to your  
clearance conditions

GURNEY BALL BEARING CO.  
CONRAD PATENT LICENSEE  
Chicago JAMESTOWN, NEW YORK New York

The central image is a detailed illustration of a Gurney ball bearing, showing the outer ring, inner ring, and balls.



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## NOTICE TO ADVERTISERS:

Printing begins on Tuesday of each week.  
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.  
New Advertisements (not changes of copy) received up

to Wednesday noon can appear in the issue of that week, but no proofs can be shown.

If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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Broadway Looking South from Sixth Street

The Heavy Traffic Street of Los Angeles

## Titanium Treated Rail On the Pacific Coast

Do you know that both San Francisco and Los Angeles are liberal users of Titanium-treated rails? Also that the Oakland, Antioch & Eastern Railway is a Titanium interurban?

The famous curves at Market Street ferry in San Francisco and the tangents on the hardest-worked Broadway track in Los Angeles are Titanium-treated.

These Pacific Coast companies were among the first to appreciate the manifest merits of Titanium-treatment.

Titanium-treatment assures you a flawless, longer-lived rail, whether for curves or tangents, whether for city or interurban operation.

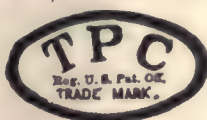
You will never regret writing it into your rail specifications!

### TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

Processes and Products Patented

General Office and Works:  
Niagara Falls, N. Y.



Pittsburgh Office: Oliver Building  
Chicago Office: Peoples Gas Building

New York Office: 15 Wall Street

#### AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland  
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England





VIEW OF TRUCK EQUIPPED WITH ROLLER BEARINGS

# ROLLWAY BEARINGS

## An Illuminating Summary

"Summing up the situation in regard to roller bearings, some of the advantages of their use may be enumerated as follows: Decrease of power, especially at peaks and during acceleration; more coasting; low lubrication and maintenance costs; reduced axle fractures; reduced pull-ins; fewer cars needed, reducing the investment, and possible adoption of smaller motors, and, therefore, less waste.

"The reduced energy demand means, in addition, wear on trolley wire and trolley wheels. With bearings of the anti-friction type, the axles are kept in the exact alignment, while with plain bearings there is considerable lost motion due to journal brass movement in the journal boxes, and to the ends of the journal being pushed to one side of the journal brass. With the anti-friction bearings there is also a reduction in brakeshoe and wheel wear. A car equipped with these bearings will coast further than one with plain bearings, and will accelerate at a higher rate with the same current."

(From an article entitled "Results Obtained with Roller Bearings on Interurban Cars" by W. B. Voth and A. C. Metcalfe, respectively Chief Engineer and Master Mechanic Empire United Railways, Inc., Syracuse, N. Y.)



*Think it over*

**The Railway Roller Bearing Co.**

SYRACUSE, N. Y.



**BRILL**

## Near-Side, Semi-Convertible Single-Truck Cars

Near-side cars are built both for single- and double-end operation. The car illustrated is a double-end type and is for one-man operation. The generous size of the platforms facilitates ingress and egress, and yet there is no waste space, as seats are provided and the platform at the rear is used for additional standing space. The carbody has seats for 28 persons.

THE J. G. BRILL COMPANY,  
AMERICAN CAR COMPANY,  
G. C. KUHLMAN CAR COMPANY,  
WASON MFG. COMPANY,

PHILADELPHIA, PA.  
ST. LOUIS, MO.  
CLEVELAND, OHIO  
SPRINGFIELD, MASS.



# The Last New York City Horse Car

ELECTRIC RAILWAY JOURNAL



To those who know the size, weight and efficiency requirements imposed by Storage Battery Car Service, the passing of the New York Horse Car is a scientific achievement. The motors and control were designed and built by the

## General Electric Company

General Office:  
Schenectady, N. Y.

Sales Offices in all



Illinois Light Weight Car—Claims' Papers—Social Relations

# ELECTRIC RAILWAY JOURNAL

New York, October 21, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 17 10c a copy



**SILVER LAKE**  
**TROLLEY CORD**

Tough, Strong, Lasting, Waterproof  
The Standard for over 40 Years

**Bell and Register Cord**  
All sizes and colors      Send for samples

**SILVER LAKE CO.**  
NEWTONVILLE, MASS.



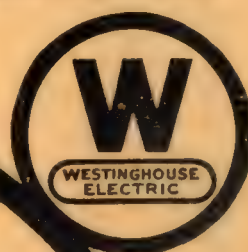


## The Choice of a Stoker

Always Narrows  
down to -



-A Study of Plant Requirements



## This Time Chain Grate!

"Well, Sam," said the Sales Manager, "how did you come out on the trip?"

"Fine. Everybody pleased. It was a plain case of WESTINGHOUSE CHAIN GRATE from the word go—cost, load and everything considered."

"What kind of load, Sam?"

"Factory. Constant operation at rating or a little over, with an occasional jump to 150% load. And the coal is Illinois screenings running high in ash—about 20%—a free burning coal which needs the advantage of the continuous dumping feature of our Chain Grate stoker."

"But how about the draft at the higher ratings?"

"Easy. Fifty feet extra stack height gives them all they need. I certainly feel that the customer did the right thing in selecting the Chain Grate, for it not only gives him just what his plant conditions require, but he has saved considerable in first cost, and the upkeep is low."

"Well, Sam, I am glad you were able to meet the customer's needs so satisfactorily. Your experience certainly does justify our contention that every stoker job is an individual job, requiring careful analysis of load, fuel and other plant conditions. Having the three types certainly places us in a position to come very close to the individual needs of each customer."

Write for descriptive literature

**Westinghouse Electric &  
Manufacturing Co.**

East Pittsburgh, Pa.

# Westinghouse





# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 17

NEW YORK, OCTOBER 21, 1916

PAGES 861 to 916

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A 32-ft. two-compartment, single-end design has given satisfactory service for three years on city lines with light traffic operated by this company, the equipment having several novel features. (Page 864.)

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

MCGRAW PUBLISHING COMPANY, INC., 239 WEST 39<sup>TH</sup> STREET, NEW YORK

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CLEVELAND, Leader-News Bldg.

PHILADELPHIA, Real Estate Trust Bldg.  
SAN FRANCISCO, 502 Rialto Bldg.

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One week required for change of mailing address. New and old addresses must be given

Circulation of this issue 7250 copies





## A Specialty and its Specialists

A Manager recently remarked to his President:

"We use Westinghouse air brakes because they're the best. They're made by specialists who make nothing but air brakes and give their undivided attention to that. They have the experience of a lifetime and know the business from A to Z.

Then there's their field corps of engineers and expert inspectors—it's the best thing I ever saw—and it's free. They'll work out any braking problem for you and supply you with the brake best suited to any particular class of service. We rely on them absolutely and call them in right along. They've helped us over many a rough place and saved us thousands of dollars real money."

*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



NEW YORK:

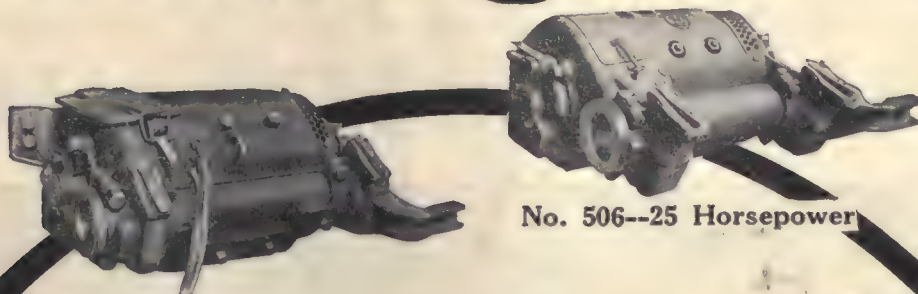
City Investing Building

ST. LOUIS:

Boatmen's Bank Building



# Westinghouse



No. 514--40 Horsepower

No. 506--25 Horsepower

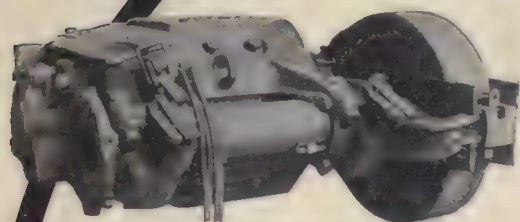
## Standard Railway Motors

A Motor For Every Service,  
City, Suburban, Interurban,  
Elevated or Subway,  
Light or Heavy Duty

These motors successfully fulfill all service requirements and insure reliable operation.

*Westinghouse Electric* developed and built the first 24-inch wheel motors.

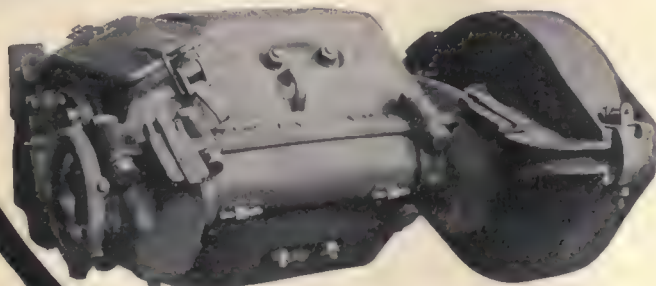
*Westinghouse Electric's* most recent achievement in railway motor design is the "WEE" Motor, No. 506, now in general use.



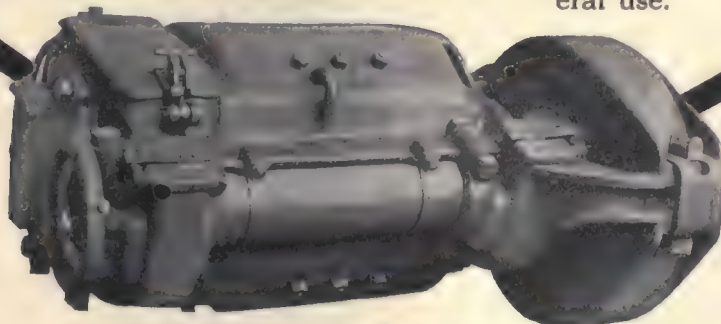
No. 532--50 Horsepower



No. 306--CV-65 Horsepower



No. 548--95 Horsepower



No. 333--120 Horsepower



**Westinghouse Electric & Manufacturing Company**  
East Pittsburgh, Pa.

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Baltimore, Md.  
Birmingham, Ala.  
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Boston, Mass.  
Buffalo, N. Y.  
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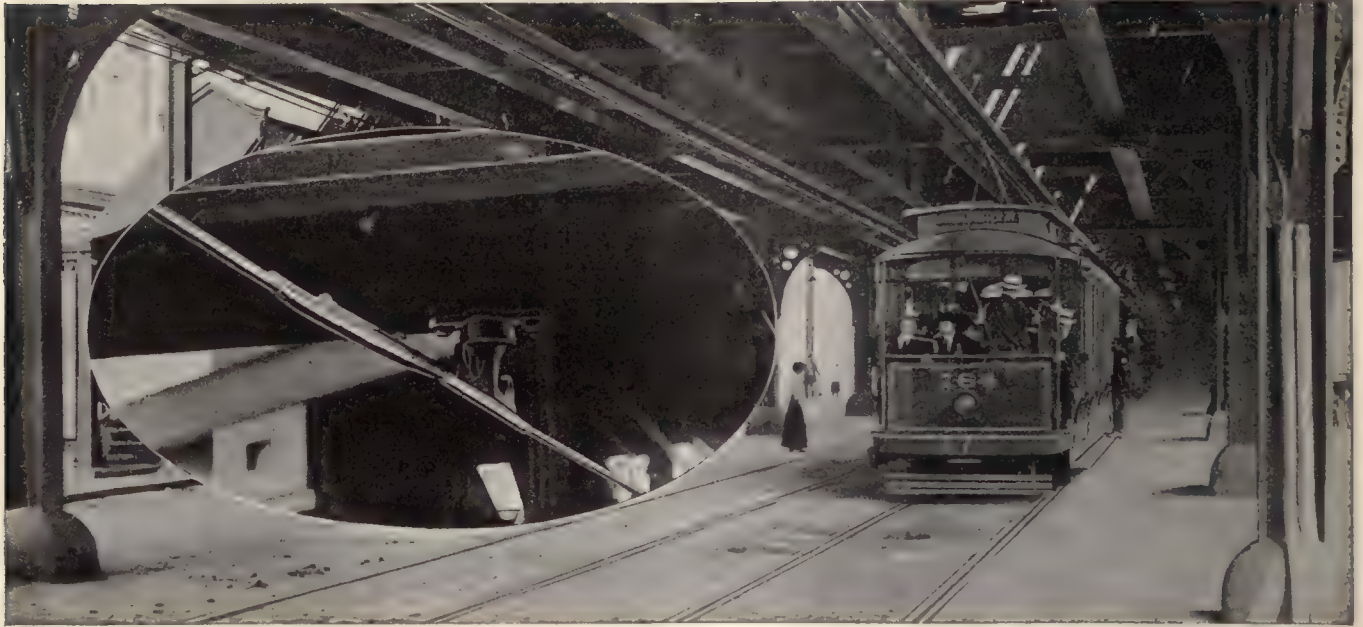
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Toledo, Ohio  
Washington, D. C.  
W. E. & M. Co.  
of Texas.



# Phono-Electric

## —The Wire of Long Life



### Does Your Trolley Wire Allow Forty per cent (40%) Safe Wear?

In May and October, 1914, the Union Railway, New York, put up 4 miles more of No. 0000 Phono-Electric Trolley Wire on Westchester Avenue between Third Avenue and Southern Boulevard (because the first half mile, installed on Third Avenue in 1908 had made good most emphatically)—

Here low clearance called for a 14 in. offset (see illustration above) and the car headway was as low as 30 seconds.

The recent calipering of the pioneer  $\frac{1}{2}$ -mile shows that at least eight years' life may be expected in this service and that this No. 0000 grooved wire can be worn down to 60 per cent of its original diameter with perfect safety. Phono-Electric is a wire without a core of softness.

That's one answer to the question "Does it pay to install Phono-Electric Trolley Wire?"

## BRIDGEPORT BRASS COMPANY

Bridgeport

Connecticut





O-B Type C Splicer with Boss

## Smooth Approach— No Bumps

The lips of the O-B Type C Splicer, pounded around the wire, provide a smooth and gradual transition from wire to splicer body for the trolley wheel.

The wire enters in a straight line without bending. This helps not only in the original installation but also when it is necessary to take up slack. Heavy steel set screws force the wire into depressions in the splicer and hold it securely.

Made of the best quality bronze, the O-B Type C Splicer has abundant strength to withstand the most severe service.

Furnished with or without boss.

*O-B Splicers are listed and described on pages  
176-184 of Catalog No. 16*

**The Ohio Brass Company**  
Mansfield  
Ohio



ANY  
TYPE  
OF  
BASE

## Permanent Track at Less Cost

OPEN  
OR  
CLOSED  
TRACK



Track laid July 1916 in Bath, Pa., by Allen Street Railway Co.

# INTERNATIONAL STEEL TWIN TIES

## *Are Economical for Light Traffic, Too*

The superior life of International Steel Twin Ties can be exploited to advantage in light service just as it has been exploited so extensively in heavy service.

For example, take this Twin Tie installation under 60 lb. A.S.C.E. rails on the Bath Line of the Allen Street Railway Company, Nazareth, Pa. It is safe to say that these ties will be there for a generation or more.

## The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

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# What Uncle Sam Says About the Economy of Track Grinding

The U. S. Bureau of Standards, in its Technologic Paper No. 62, of March 10, 1916, says, among other things:

"Continual pounding of a joint eventually develops a cup in the receiving rail, and rapid deterioration follows if the joint is not given proper attention."

"On newly bolted joints a difference in elevation of the abutting rails often exists, and unless filed or ground down to a perfect surface alignment will soon develop pounding and cupping."

"A number of companies now make a practice of running over all newly bolted joints with a track grinder and find that the slight expense is well justified by the increased smoothness and resulting longer life of the joints."

Of course, we have said all this ourselves in our advertisements of the

## Reciprocating Track Grinder

but it takes an organization with nothing to sell, like the U. S. Bureau of Standards, to give the truth of such statements their full significance.

We know of no better way to bring home the truth of our statement that the Reciprocating Track Grinder affords the best, quickest and cheapest way to do track grinding than to farm one out to you. When the seed of its economy has taken root on your own soil you can pay for it.



**Railway Track-work Company**  
30th and Walnut Streets  
Philadelphia





## Rerouting Because of Joint Repairs a Needless Loss

Of course, you have noticed how the earnings of a line drop during a period of rerouting or temporary single-track operation.

It is then that a lot of short riders walk, and many a shopping ride or visit is omitted until the service is restored to par.

Have you ever traced the connection between these losses and their cause or have you assumed with resignation that track repairs are an unescapable evil?

A rail that is really continuous will give you very little trouble indeed. Hence if repairs are frequent, you are using an inferior joint.

Therefore, why not analyze your causes for rerouting, and debit the upkeep of the joint with the revenue that you lost through its failure?

Such an analysis will show how insignificant is the *first* cost of a joint or weld compared with its cost for repairs and its responsibility for lost revenue.

## The Thermit Insert Weld is the Weld that Saves Rerouting

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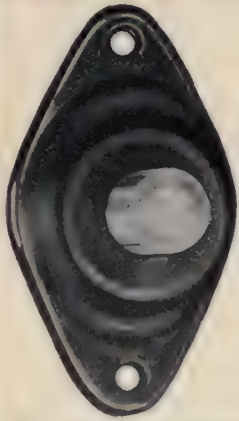
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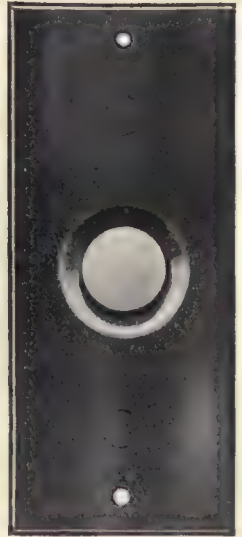






No. 19405 Push Button

# To Save Barrels of Batteries Use Faraday High Voltage Car Signals



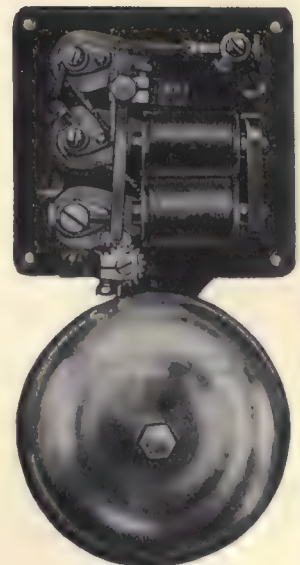
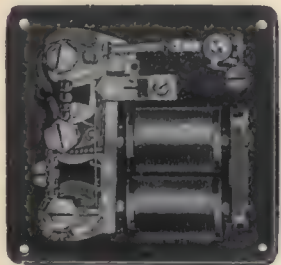
No. 19591 Push Button

Resistance  
Push Buttons  
Bells  
Buzzers



No. 19402 Resistance Panel

Resistance  
Push Buttons  
Bells  
Buzzers

No. 19403  
Standard BuzzerNo. 19586  
Single Stroke Bell

Faraday car signal systems are for operation direct from the trolley circuit of from 500 to 600 volts. Their use eliminates entirely the cost and annoyance which almost invariably result from the use of battery systems.

Faraday Resistance Panels contain resistance units in cartridge form so that the replacement of a resistance unit is an easy matter. These resistance units are absolutely permanent and are mounted on slate bases.

Faraday Push Buttons are designed especially for use on high voltage circuits. They are constructed particularly for car installation, are tamper-proof and when properly installed are absolutely unfailing in operation.

Faraday Bells and Buzzers are likewise unfailing in operation because they are properly insulated and protected from injury by cast iron covers which also make them absolutely waterproof. And because all Faraday bells and buzzers have platinum contacts and micrometer lock adjustments which cannot possibly change due to car vibration.

When you buy Faraday Car Signals you get the best equipment to be had and their use will mean that you can forget about car signal maintenance and its cost.

**ORDER YOUR EQUIPMENT NOW**

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*Manufacturer of Railway Material and Electrical Supplies*

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# Practical advice in the shop is trouble saved on the road

That is one of the many benefits secured through our free Expert Service. Read the following partial report from one of our Experts:

"The manager understands of course that if the bearings are in poor condition, even the best oil will not prevent trouble, but he is greatly perturbed by the hot boxes on their interurban cars. I have made *suggestions* to obviate this and bring about permanent betterments to the service, as follows:

"First—The work of rebabbitting journal brasses should be done at the main shop and by one man, so as to place the blame for poor work that is being done.

"Second—That a more liberal supply of new brasses be placed in service, as there are a number of the old ones that must be scrapped.

"Third—That as soon as possible rebabbitting of journal brasses be discontinued and the brass be allowed to wear to a scrapping point and then taken out of service.

"Fourth—On account of the high speed and weight of cars, there should be a more liberal renewal of high grade packing, as a large proportion of the journal packing now in service is short strands, and while it would prove satisfactory in slower service, it is not conducive to good operation under the present conditions.

"Also, I have *requested* them to discontinue a practice which, no doubt, has been the cause of a part of the journal trouble, and if continued it will ruin the journals. I refer to a block of wood that has been made in the form of a journal brass and when they have a hot journal they remove the brass and put in the block of wood with a sheet of emery cloth on its face and then run the car. The result is another hot journal, as it is impossible to remove all the emery from the journal without removing the journal box. Furthermore, any irregularity in the journal face or diameter will be aggravated by such a proceeding and new journal brasses will have so little surface in contact with the journal that the weight per square inch is out of all proportion to what it should be. This was proven by an inspection of journal brasses that had only been in service twenty-four hours. The journal box dust guards have not had the attention they deserve, and there are a number of journals without them."

Little things? Yes. But it was the viewpoint of a practical outside man that discovered them and realized their important effect on good service. That is what our Experts will do for you—point out the little faults, far reaching in their unfavorable effect on your service, that you have lived so close to that they have been unnoticed. And note that our man made only SUGGESTIONS and REQUESTS of the railway officials—no commands, no arbitrary demand that such and such a thing be done—it is up to the officials to accept or reject our recommendations. But the wide-awake railroad man is looking for practical advice. And we are equipped to give it to him.

## Galena-Signal Oil Co.

Franklin, Pa.





# National Pneumatic Control Makes These Great Cars Faster and Safer

Capacity and speed of passenger interchange are the essentials of the city rapid transit car.

Consider the splendid type of cars of the New York Municipal Railway Corporation, Brooklyn.

It has a seated load of 78 to 90 passengers and a total load of 260 passengers.

Such capacities would make this car prohibitively slow if exit and entrance depended upon the usual end doors.

Hence, the New York Municipal car has three pairs of air-operated doors, per side, all operated by one guard, so that despite its great length of 67 ft.—

The average distance between door and seat is only 6 ft. 6 in.

And to insure the speediest and safest handling of passengers at these doors, the New York Municipal Railway Corporation has in use or on order a total of

## 250 Cars with National Pneumatic Control

# NATIONAL PNEUMATIC COMPANY

50 Church St. New York

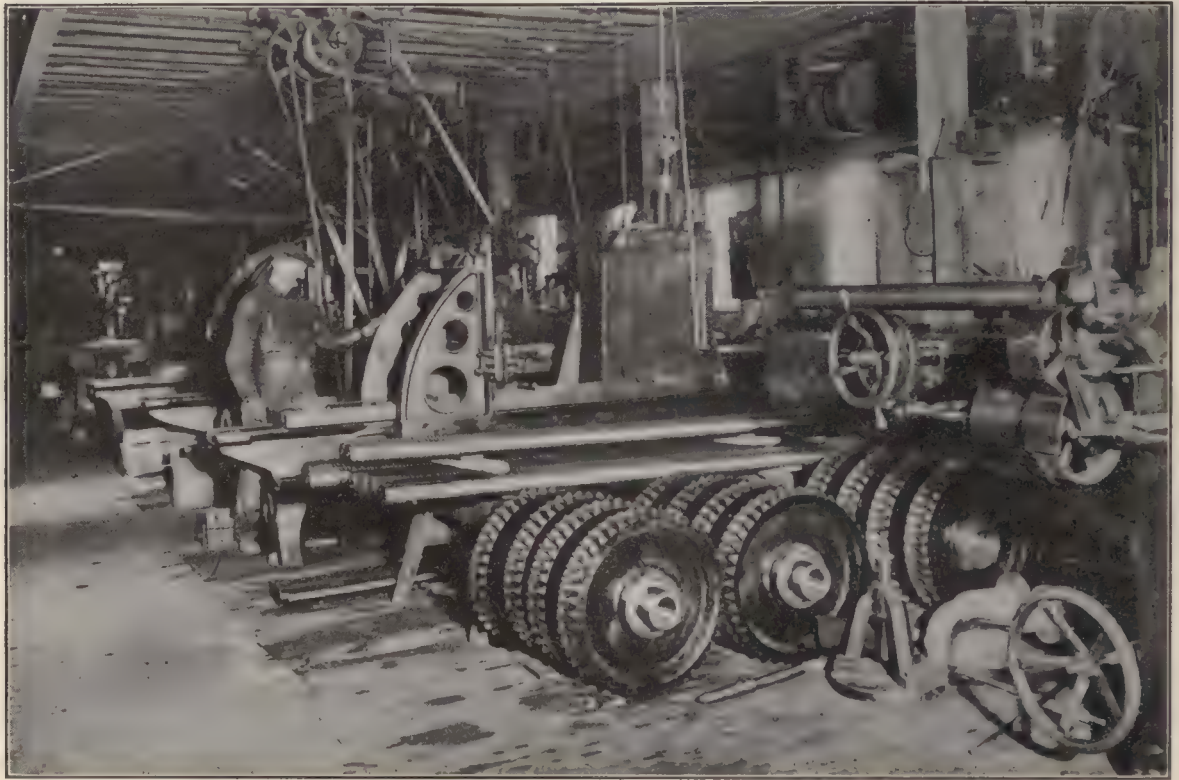


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## Columbia-Made Motor-Driven Car Hoists



Parts of Columbia-made motor-driven car hoist with bevel-gear and worm transmission

Here's the famous Columbia-made motor-driven car hoist in the making!

We finish every part of the hoist ourselves, asking you only to furnish most any old traction motor to run it. This hoist is made

To raise cars of any length

To raise cars at 1 ft. per minute (ordinarily)

To raise cars without any swaying.

Columbia-made *wheel-changers* are also of worm and screw type. They lift 2000 lb. easily; can be made for hand or motor operation and also with automatic cut-outs to prevent the motor-driven screw from running back.

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Trolley poles (steel) and wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.





# A DIFFERENCE IN CO-EFFICIENTS

Co-efficient of plain bearing journal friction at 12.75 miles an hour=  
0.033.

WHICH  
WILL  
YOU  
HAVE?

Co-efficient of Hess-Bright journal friction at 12.75 miles an hour=  
0.0012.

*Here are the co-efficients of journal friction for plain and Hess-Bright ball bearings as calculated for the New York State Railways-Rochester Lines, and published in the Electric Railway Journal for Dec. 25, 1915.*

To overcome the resistance due to the weight of 10,544 lb. on the two journals per motor, there was required at the surface of the journals a force of  $10,544 \times 0.033$  or 348 lb.

As the journal was 3.75 in. in diameter and the wheels were 33 in. in diameter, the force reduced to tractive effort becomes

$$3.75/33 \times 348 = 39.6 \text{ lb.}$$

Dividing 39.6 by 6.63 (the weight per motor in tons) it was found that

Plain bearings demand 5.97 lb. per ton tractive effort to overcome journal friction.

The corresponding tractive effort for Hess-Bright ball-bearing journals is in the ratio of the co-efficients of friction,  $0.0012/0.033 \times 5.97$ . So that

Hess-Bright ball bearings demanded only 0.21 lb. per ton to overcome journal friction.

The actual energy saving with Hess-Bright Ball Bearing Journals over many tests was 14.1 per cent.



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This cottage consumes about 1 Kwh. per day.

*This consumption is measured by a meter in the house.*



This car consumes over 100 Kwh. per day.

*Yet there is no meter in the car to measure this power consumption.*

# Inconsistent, Isn't It?

**I**F you operate a combined lighting and railway property you know that the principles of good business demand accurate measurement for the service rendered, even to the smallest householder. You install a meter in a story-and-a-half cottage where the current consumption will be far less than 1 Kwh. per day.

Do not the same fundamental reasons call for a measuring device on a car which consumes over a hundred times as much current in a single day? In the case of the householder economies will be practiced, for he pays the bill. But any power wasted by the motorman is paid for out of the company's pocket.

Sangamo Economy Meters will meet this requirement and in addition will encourage your men to make greater efforts toward efficient operation.

Numerous properties all over the country are using these meters to improve their operation. Let us tell you of the results. Just drop us a line and complete data will follow by return mail.

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**METERS**

**Sangamo Electric Company**  
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# RICHEY'S ELECTRIC RAILWAY HANDBOOK

SENT ON APPROVAL—NO MONEY DOWN

## LAYOUT—EQUIPMENT—OPERATION— MAINTENANCE

of electric railways are fully covered in this handbook.

Every section is a clear, condensed statement of the best modern practice. There are valuable tables and diagrams for quick reference. Every item is indexed so that you can find it instantly. In printing, paper and flexible binding the book represents an ideal—a real tool.

In determining the scope of the book these ideals have been kept in mind:

- (1) To present data on subjects which come up in every-day electric railway practice for constant use by the operating, constructing or designing engineer.
- (2) To produce a book of service to the non-technical manager or operator as well as to the engineer.
- (3) To produce a reference book on electric railway practice for those who may be specializing in other or allied lines.

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On the Molding Floor  
Where  
Davis Steel Wheels  
Are Made

## *Smooth Molds Insure Perfect Surfaces On Davis Steel Wheels*

Molding sand accurately mixed by weight and milled to a flour-like texture insures hard, smooth molds.

This sand mixture is rammed against the face of the pattern, the backing sand filled in, and the mold placed upon the jolter in order that it shall be solid throughout.

The finishing touches are applied to the two sections of the mold before it passes to the casting floor. These green sand molds are "skin dried." Their surfaces, therefore, are exceptionally hard, and as smooth as stove plate. That's why Davis Steel Wheels appear so smooth and well finished.

Such extreme care is exercised in every step in the manufacture. Strength and safety are paramount.

For instance, the tread of a Davis Steel Wheel must show an exact chemical analysis. Sufficient manganese to make the tread hard and tough is present. This gives the famous "one-wear" steel tread, the greatest economy in car wheels.

While the tread and flange are of manganese steel, the plate and hub remain soft and ductile to resist the strains of hard service.

You are probably wondering how a single casting can show different mechanical properties in different sections. Read our page in the issue of November 4th.

### DAVIS Steel Wheels

The steel wheel with the one-wear tread.

No turning—no trouble with motor clearances.

A hard, tough manganese tread and flange.

A soft, ductile steel plate and hub.

Reduction in slid-flats.

20% saving in weight.

Minimum maintenance cost.

Strength — safety — economy.

The steel wheel backed by years of successful service.

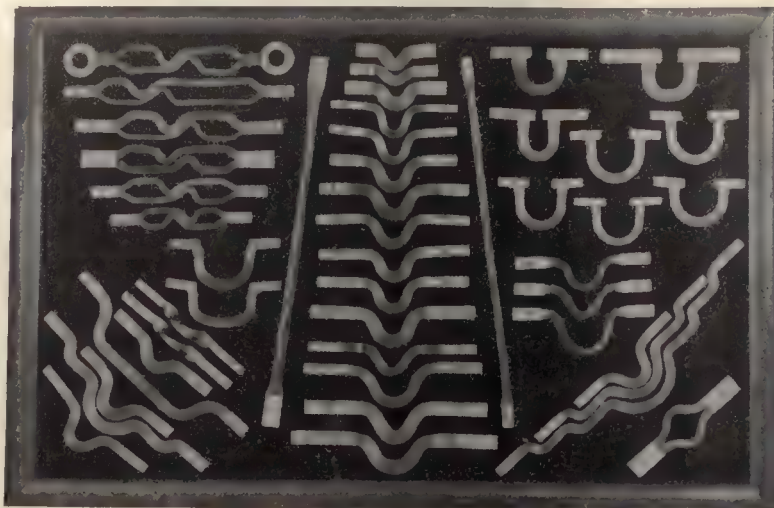
You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A.E.R.A. specifications and your service requirements. Write.

# American Steel Foundries

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There is no shortage of Erico Bonds, despite the fact that thus far 1916 has been the best of the 16 years of Erico success.

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Cleveland, Ohio



## Insulation Prestige is Not Won in a Day

The purchasing departments of electric railways are not swayed by claims in the matter of line insulation. Adoption of faulty material works far-reaching havoc. The fact that

### Aetna Insulating Material

has been the standard electric railway line insulation for more than twenty years, participating in two decades of railway growth and improvement, carries its own moral. As the basis of Anderson Line Insulating Specialties, Aetna has materially reduced the cost of line maintenance.

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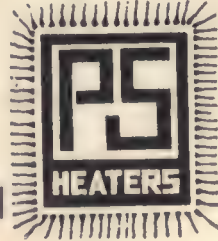
Peter Smith Forced Ventilation Car Heaters are guaranteed to maintain a temperature of at least 50 deg. Fahr. They deliver 300 cu. ft. of fresh, warm air every minute, at a total operating cost of 28 cents per 18-hour day.

The ventilating fan can be operated in summer as well as in winter.

Writing for data and blueprints on these heaters is one of the things to do today.

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# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.  
Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII

NEW YORK, SATURDAY, OCTOBER 21, 1916

No. 17

## INVESTIGATE SNOW-FIGHTING EQUIPMENT

Among the subjects which will be assigned for consideration this year by the Engineering Association, it has been suggested that it might be well to include an investigation of the subject of snow-fighting equipment. So far as we know, this matter has not been treated within recent years certainly by any committee, yet it is of very live interest to all companies in the northern sections of the country. A great variety of equipment is now in use on these properties, and almost an equally large number of theories exist as to the proper methods of combatting snow. All of these cannot be best for all conditions. One reason for a variety of practices in snow-fighting equipment is undoubtedly the fact that much of this equipment is home-made because it is used for only part of the year. Of course, home-made equipment may be just as efficient as any other for this purpose, but this fact is another reason why the subject could well be reviewed by a committee to compare the practices that are now used by different companies and to outline the requirements that are demanded of equipment for effectively removing snow.

## A FINE REPORT OF PROGRESS

We have already referred to the high character of the Atlantic City report of the sub-committee on social relations, abstracted elsewhere in this issue. Although called a progress report, it is actually one of the most important ever presented to the American Electric Railway Association. It is not only a dispassionate exposition of the advances made by electric railways in solving employee problems through social insurance, but also a far-sighted discussion of the future application of social economics along insurance lines. The committee strongly suggests, as a necessary and probable development of the near future, compulsory life and health as well as accident insurance for all American wage earners, most of which insurance, it states, could well be managed by joint boards of employers and employees in the various industries under regulations made by law. In the electric railway industry the best progress in procuring social insurance has already been made through mutual benefit associations thus jointly supported and managed, but if the industry is to secure the maximum benefits for employees as social insurance spreads, it must continue its good work along this line and so efficiently perform its social function as to keep itself free from the loads of other industries or overhead government costs. It is essential, therefore, that the electric railways thoroughly

understand the social insurance theory of assisting individual progress through the co-operative handling of hazards—a sane compromise between extreme paternalism and extreme individualism—and that they know the relative efficiency of methods under this theory. The sub-committee has furnished in elaborate form the material for such knowledge, and it should be used to the fullest possible extent by all electric railway officials.

## AXLE-MOUNTED MOTORS ON THE MILWAUKEE

On the giant locomotives for the Chicago, Milwaukee & St. Paul Railway, which are described in considerable detail on another page, there is one feature that seems to us to stand out in importance before all others, with the possible exception of the ingenious scheme whereby regenerative braking is accomplished with direct-current motors. This dominating feature is the successful application of the so-called trolley-car drive, or the direct-axle-mounted arrangement for the motors, and the fact that it has passed satisfactorily through practically a full year of service on these heavy engines cannot fail to have far-reaching influence on electric locomotive design of the future. To the axle-mounted motor may be ascribed the very great advantages of simplicity and accessibility, but for heavy, high-speed locomotives the low-hung non-spring-borne weight has frequently been regarded with suspicion. On the Milwaukee's electrified divisions the rail is of 85-lb. and 90-lb. weight with four-bolt and six-bolt joints, the rail being double spiked and equipped with tie plates at all curves. Manifestly, this construction is of a high grade, but it does not by any means go beyond the practice that is customary for the better class of steam railroad. As a matter of fact, there is no difference between the track construction on the Milwaukee's electric zone and that found throughout the remainder of the road. If, then, the Milwaukee's high-speed and ultra-heavy electric locomotives can be operated for a year without troubles on this score, it seems to be safe to say that the old bogey of track damage from electric locomotives with direct axle-mounted motors may well be laid away permanently. Whether the simplicity of this arrangement can overbalance the advantages of wider clearances and concentration of power that are possessed by the frame-mounted motor is, of course, still to be determined, but from the evidence at hand the issue between the two types of design can no longer be complicated by the highly nebulous question of the relative influence that is exerted by each one upon the track.



## ELECTRIC RAILWAYS IN MOBILIZATION

We are very glad to see the military authorities taking up seriously the work long ago advocated in these columns, of organizing the electric roads of the country for maximum efficiency in case they should be needed for military purposes. The addresses of Colonel Baker and Captain King at the Atlantic City convention last week pointed the direction in which electric railway companies and their officials can be of assistance to the War Department, and we feel sure from the indications already plain that electric railway men will co-operate in the heartiest and most patriotic manner to the furtherance of so good an end. Not only can this great network of subsidiary lines be made immensely useful for mobilization, but it can be turned to admirable account in the organizing of a proper supply system.

The time has gone by when an army can cut loose from its base, as did Sherman's, and live on the country while carrying its supplies of ammunition with it. These last must now be so prodigious as to demand in themselves transportation facilities to an amount hitherto unimagined. The work of military transportation requires a close co-ordination of facilities which cannot be attained by any suddenly extemporized means. Everything must work intelligently together on a well-devised plan in order that the steady stream of material can be kept up. It is notable during the progress of the European war on the western front that more than one promising drive has been checked, not for lack of men, but for lack of shells.

There are hundreds of active and patriotic young men in the electric railway service, not immediately available for the organized army, who would esteem it both a duty and a privilege to fit themselves to deal efficiently with the work of the quartermaster's department along their own familiar lines of operation. They could do this without interfering with their ordinary duties or giving time which they could ill spare to temporary service, if only the military authorities would arrange a proper scheme of instruction. If our country unhappily should get into war it would need an immense host of officers trained at least in the rudiments of their duties, and how can it better further efficient preparatory work than by taking advantage of men who are professionally trained already in part of what would be their military duties. Many a man who is extraordinarily competent to devise and carry out an emergency supply system may be from age, physical disability or temperament unfitted for active service. This indeed is one of the great problems in England at the present time, to make each man fit into a co-ordinated scheme of defense in the most efficient fashion.

The working out of a great scheme of transportation service, utilizing the personnel made available by its experience, is of particular importance in a country of great distances like our own, and we earnestly hope that the good work now inaugurated will go on with the co-operation of the War Department. Such a movement is part of the general scheme of preparedness which is so clearly shown to be necessary at the present time.

## MAKING SALARIES PUBLIC

At a recent commission hearing in which the cost of service was being analyzed with great care, counsel for the city requested that the names of all employees in the company's engineering department, with the salary received by each man, be read into the record or filed as a public exhibit. Representatives of the company immediately offered objection on the ground that the publication of names and compensations corresponding had never been the policy of the utility in question, and that such a course would be likely to impair discipline. As the city did not press for a ruling at the time, the issue was not forced, but the point raised was of much interest, and its discussion occupied the hearing for about half an hour.

The point was made that since salaries of employees in the public service are fixed and open to all inquirers, those of employees in quasi-public duty should be equally exposed. An important distinction, however, was overlooked in this connection. In the particular company before the board, salaries are paid to men as individuals of proved value to the utility rather than to the occupants of certain well-defined positions. In the public service, a stated position generally carries with it a stated salary, and so long as the incumbent can fill the office, his personal abilities expressed as variants above the normal have comparatively little effect upon his compensation. This, in fact, is one of the most depressing features of public service and is one of the chief arguments against governmental ownership and operation. The stimulus of financial reward is lacking in comparison with that in private or semi-private business.

It may be conceded that the city was entitled to know the details of the so-called special payroll of the company, so far as relates to the number of men receiving salaries of each grade, but it is hard to see that it is of the slightest consequence to the public interest to make public the facts that Mr. A receives \$150 per month, that Messrs. B and C receive \$125 per month each, and so on. We believe that fairness to the individuals whose compensation is often unknown to each other, and whose pay is settled by the management after careful consideration of their individual and personal qualifications, justifies a company in refusing to give out this information in any other form than the number of men receiving \$150 per month, the number receiving \$125, and so forth. In fact, it ought to serve the ends of justice in many cases to present a total of salaries for a department with the total number of men employed, enabling the average salary to be determined by simple division, and if demanded by the tribunal sitting in the case, the maximum and the minimum compensation accorded. Some consideration for the personal aspects of employment is still essential, and needless publicity of the earnings of specific individuals adds nothing to the value of evidence in a rate case, but tends to create dissatisfaction and possibly internal friction in an otherwise harmonious organization.



# The Newspapers—Your Friends or Your Enemies?



The Public Utility Corporation Is Full of News—LET IT OUT!

**W**HAT would become of the department store that used, misused or didn't use at all the newspapers the way most utility companies use, misuse or don't use the press?

A public utility is even **MORE DEPENDENT** than a department store upon the good-will of the press and public.

But you say you have no lingerie bargains to advertise.

Perhaps not; but you have even more important things to gain than 49-cent customers.

You have a public service to sell.

To sell it in peace and profit you must have public **UNDERSTANDING** and **GOOD-WILL**.

You can get both by proper use of the newspapers.

The public utility corporation is full of news; **LET IT OUT.**

If you have anything to announce that is not news, pay for its publication in the form of advertising.

But your day-by-day affairs; what you are doing; how you are doing it; how that accident happened and how you purpose to prevent another like it; how

your income is spent; why you don't do some of the things that the public wants you to do—

All this is information that any newspaper is glad to print.

And the printing of it, coupled with the established conviction that your door is open to newspaper men, to anyone, in fact, who has a question to ask or a criticism to offer, will make the newspapers your **AIDES** instead of your enemies.

Do you cultivate newspaper men—owners, editors, reporters—as you cultivate bankers and politicians? **IF NOT, WHY NOT?**

These days the newspapers make and break bankers and politicians—and railways.

If the press and the general public—which largely derives its opinions and impressions from the newspapers—

If these are your friends you won't need any others.

The best man to do the every-day cultivation of newspapers is a newspaper man—a **PUBLICITY MAN**.

What's that? you ask.

See Talk No. 4, next week.



# Illinois Traction System's One-Man Car

A 32-ft. Two-Compartment, Single-End Design Has Been in Satisfactory Service for the Past Three Years on City Lines with Light Traffic Operated by This Company, the Equipment Including a Number of Novel Features

**J**ITNEY bus competition on several of the Illinois Traction System's street railway properties, together with a desire on the part of the management to furnish a more frequent service at a lower operating cost resulted in the construction of a number of one-man cars by this company some three years ago. These equipments seat thirty-seven people and weigh 23,500 lb., so that they not only reduce platform cost but furnish a seating capacity equivalent even to some double-truck cars. Moreover, the reduction in weight decreases energy consumption, overhead and track maintenance. Aside from these features, there were incorporated in the car equipment safety appliances consisting of a dead man's control, air-operated doors and steps and an emergency rear door, all so arranged that the car cannot be started when the doors and steps are open and the doors and steps cannot be opened when the car is in motion. As a result the cars have proved to be as safe as any type operated by two men, and the past three years' experience with them has been thoroughly satisfactory from an operating standpoint.

## CAR BODY ARRANGEMENT AND CONSTRUCTION

The general design, being of the one-man type, is arranged for single-end operation with exit and en-

trance doors at the front and an emergency exit door at the rear. The car floor is continuous through the car body and vestibules. The body is arranged in two compartments, namely, the main passenger compartment at the front end of the car, where space is provided for the entrance and exit of passengers as well as for the motorman, and a smoking compartment occupying the rear vestibule, the latter being separated from the main passenger compartment by a bulkhead fitted with a sliding door. Longitudinal seats are provided in the main passenger compartment, and there are seats along the sides and around the end of the rear vestibule, except for an aisle to the emergency door. The general dimensions are as follows:

Length overall, 32 ft. 4 in.

Height from top of rail to top of trolley, 10 ft. 9 $\frac{5}{8}$  in.

Height from rail to car body floor, 28 in.

Height from rail to top of first step, 14 in.

Height from first step to car body floor, 14 in.

Distance between side posts, 2 ft. 3 $\frac{1}{2}$  in.

Width of car over side plates, 8 ft. 2 in.

Gage of track, 5 ft.

The underframing of the car, which was greatly simplified by the omission of drop platforms, includes side sills that consist of  $\frac{3}{8}$  in. x 2 $\frac{1}{2}$  in. x 3 in. angles running



ILLINOIS TRACTION'S ONE-MAN CAR—VIEW OF CAR IN SERVICE



in one continuous length from buffer to buffer and offset at one side for the exit and entrance doors in the front vestibule and for the rear emergency door. The two cross-bearers in the center of the underframe and those at the vestibule corner posts are formed of 3-in., 5.5-lb. I-beams. The next set of cross-bearers to those in the center of the underframe are 3-in., 7½-lb. I-beams, and those at the body corner posts are 4-in., 7½-lb. I-beams. Diagonal bracing in the two vestibule panels of the underframe is provided by two ¾ in. x 3 in. x 3 in. angles. The underframe is of the side girder type, and the girders are formed of 1⅝ in. x 32 in. plates reinforced at the top by ¾ in. x 3 in. belt-rails which extend the full length of the girder.

The posts are of ash mortised into long-leaf yellow pine sills which are bolted to the steel underframe. Each post is securely bolted to the girders by four  $\frac{3}{8}$ -in. turned-head carriage bolts. Plates are installed and these also are of long-leaf yellow pine and they are mortised for top-post tenons. The letterboard is made of poplar dapped over the side posts to which it is securely glued and screwed. The arm rails are made of ash dapped over the side posts, and the outside of the vestibules below the windows is covered with No. 14 gage steel. The roof is of the plain-arch type and of wooden construction, except over each side post where it is reinforced with a  $\frac{3}{8}$  in. x  $1\frac{3}{4}$  in. steel carline.

Mahogany of a plain design is used for an interior finish. The ceilings are formed of three-ply poplar veneer; the sashes are of mahogany and the hardware is highly polished bronze. The seats are of the longitudinal type and they are upholstered in rattan. Other specialties include the Consolidated Car Heating Company's buzzer system, Empire Safety treads and Pantasote curtains on Edwards spring rollers, fitted with Curtain Supply Company's ring-type fixtures.

## TRUCKS AND SAFETY APPLIANCES

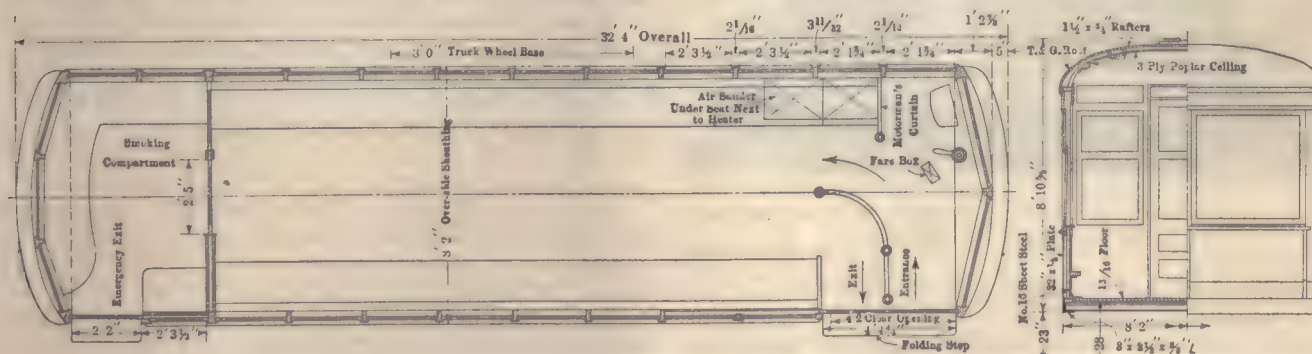
A single truck of special design has been provided for the car, the bottom member of the truck frame being formed of  $\frac{1}{2}$  in. x 3 in. x 3 in. angles, and the top member of  $\frac{1}{2}$  in. x 4 in. x 4 in. angle. Four elliptic springs are mounted on the four outside corners of the truck frame and these carry the body. The journal-box yokes are arranged to permit the wheels to be removed in an ordinary drop pit, and longitudinal motion of the car body is limited by providing a dampener between the truck frame and one of the body-underframe cross-bearers. Similarly, coil springs are provided in conjunction with the elliptic springs to obviate unnecessary vertical movement. The truck is fitted with 28-in. wheels, and has an 8-ft. wheelbase. The motors are Westinghouse Type 328, similar to those used on the original low-floor Pittsburgh car.

Undoubtedly the most interesting features of the car are included in the provisions to make its operation by one man safe under all conditions. As mentioned earlier



ILLINOIS TRACTION'S ONE-MAN CAR—INTERIOR VIEW OF CAR

in this article, these features include air-operated doors and steps so arranged that the car cannot be started when the doors and steps are open, and they in turn cannot be opened when the car is in motion. In order to combine these functions in as simple an apparatus as possible for one-man operation it was necessary to purchase special equipment. Since doors and steps were to be air-operated and interlocked with the brake system the Westinghouse Traction Brake Company was requested to develop a brake apparatus which would not only perform its function, but would also operate the doors and steps and sand the rail in one operation. The resulting new type of equipment was described in the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1916. Some features of the scheme of operation, however, were not mentioned in that description and may well be outlined at this time. Obviously, the object of the combined air-brake and door-operating apparatus is to reduce the number of handles to be actuated by the motor man. The brake valve, as described, has been arranged not only to supply air pressure to the air-brake apparatus



ILLINOIS TRACTION'S ONE-MAN CAR—FLOOR PLAN OF CAR AND CROSS SECTION



in the usual way, but to supply air pressure to the front-door operating cylinder, and also includes a feature which enables the motorman to sand the rails, merely by depressing the brake-valve handle.

edge gained in their operation has led to the development of a still lighter car designed on the same principles, and equipped with the same safety appliances, which have shown themselves to be an important oper-



ILLINOIS TRACTION'S ONE-MAN CAR—SIDE VIEW OF SPECIALLY DESIGNED SINGLE TRUCK

In normal operation the plan is to control only the front door and step in addition to the air brakes by means of the brake valve. The rear door is intended for an emergency exit, and its operation is controlled by an emergency valve and not directly by the brake valve. On any occasion which produces an emergency action of this valve, an emergency application of the air brake is made, and the front and rear doors and steps open. After such an application of the emergency valve a pause of approximately twenty seconds is required before release of the brake and doors can be effected. In order to avoid holding the front and rear doors open for that period of time in disagreeable weather, a cut-out cock with a side vent has been installed in the motorman's cab adjacent to the brake valve, which, if operated, will serve to release and close the doors and steps, but this in no way affects the air brakes. Emergency operation may be caused in four different ways—by placing the brake-valve handle in the emergency position; by removing the hand from the controller handle while in a feeding position; by opening the conductor's valve, or by a rupture in the air-brake piping system.

Safety under all operating conditions was the motive which also governed the design of the door-operating mechanism. When the front door is opened the step drops quickly and it is in the lowered position by the time the door is opened 12 in. or 14 in. Any additional travel of the door toward its open position does not affect the step, and consequently when it is being closed the door will travel to within 12 in. or 14 in. of its closed position before the step is raised. The general operation of the rear-door mechanism and step is similar to that of the front door step, except that the rear door is automatically fastened shut so that it cannot easily be opened by hand.

Reference has already been made to the fact that these especially-designed one-man cars were put in operation in August, 1913. The complete description,



ILLINOIS TRACTION'S ONE MAN CAR—END VIEW OF SPECIALLY DESIGNED SINGLE TRUCK

however, has been withheld until experience has proved the equipment satisfactory from every standpoint. Since their construction the cars have thoroughly established their reliability and economy and the knowl-

ing feature of this type of car. The cars were designed by J. M. Bosenbury, superintendent of motive power and equipment, under the direction of H. E. Chubbuck, vice-president executive of the Illinois Traction System, and they were built in the shops of the St. Louis Car Company, St. Louis, Mo.

## Doherty Railway Managers Meet

Discuss Operating Topics—F. R. Coates Suggests Ten Commandments for Improving Public Relations

THE first separate convention of traction managers of the Doherty Organization was held at Toledo on Oct. 5, 6 and 7. What bids fair to be a permanent result of the convention was the appointing of a committee consisting of J. H. Van Brunt, St. Joseph, chairman; Albert Swartz, Toledo; B. Waller Duncan, Cumberland; C. D. Flanigen, Athens, and R. L. Lindsey, Durham, to draw up recommendations for the handling of Doherty railway problems, and which will be submitted to the firm. This committee at the conclusion of the convention announced that on account of the many meritorious features of the discussion, it was decided to hold a conference before drawing up the final recommendations. This meeting will be held at St. Joseph, Mo., very shortly.

The two-day session was attended by about forty Doherty men, many of whom were cadets at the Toledo school. All the traction managers were present with the exception of Guy W. Faller, Amarillo; W. H. Merritt, Bartlesville, and A. B. Paterson, Meridian. These managers were prevented from attending by pressure of business. Meridian was represented by T. F. McArthur.

The convention was opened by Chief Engineer Bump and the visitors were welcomed by Frank R. Coates, president Toledo Railways & Light Company, and also by Mayor Milroy of Toledo, whose address showed the standing of the Rail-Light Company and Mr. Coates personally in that city and with its chief executive. This tribute was considered an excellent example to the other managers of the value of a friendly public policy.

A letter written by Henry L. Doherty to Harry Abel some fourteen years ago, when the latter was managing the San Antonio property for the American Light & Traction Company, was read by Mr. Scott as a standard example of what a managerial report and analysis should be. R. F. Carbutt, traction and district engineer, then explained the purpose of the gathering.

Mr. Coates spoke on "Public Relations" and told of his Toledo experience and recommended courteous reception of all complaints and also a careful investigation. "Welfare Work and Public Policy" were the topics treated by Mr. Bump. "Transportation" was the subject treated by Mr. Van Brunt, and one of his important points was the consideration of schedules.



R. L. Baker, electric and district engineer, read a paper on "New Business Methods for Railways," and advocated the adoption of a numerical system to indicate routes to the traveling public, this system having been in successful operation in Chicago and Philadelphia for several years. E. R. Kelsey, advertising manager Toledo Railways & Light Company, in an address on advertising advocated a central bureau to handle all Doherty advertising and particularly that in the street cars. This was along the lines suggested by S. B. Severson, general manager of the Manhattan & Queens Traction Company, who spoke on "Discipline" and believed in the merit and demerit system, as he has used this on the M. & Q. with good success.

Dewey C. Bailey, of the legal department of the Toledo Railways & Light Company, spoke on "Claims," and believed that the trained man is the best preventer of accidents. Harry L. White, assistant commissioner of safety, reviewed the work done in the last year. J. M. Enright read a paper on "Handling Crowds."

At the conclusion of the first day's session the delegates visited the Water Street plant and the Overland works and at night were the dinner guests of Mr. Coates at the Toledo Club.

On Friday W. W. Lowe, in charge of the Toledo Cadet School, spoke on possible economies in electric railway operation and advised rapid braking and starting. C. E. Murray, secretary Toledo Railways & Light Company, led the discussion on accounting and referred to several short-cut methods in use in Toledo, such as the counting of transfers. The paper on "Track" read by Albert Swartz, track specialist of the Doherty organization, uncovered a great difference of opinion on what should constitute standard construction and maintenance. It was generally agreed that uniform practice was not yet practicable because of the many differences in traction properties. Improvement in design of overhead work both as regards money expended and maintenance was treated by W. E. Richards of Toledo. H. F. Wheeler, general manager of the Hattiesburg (Miss.) Traction Company, spoke on the problem of the small company because of the serious competition with privately-owned automobiles. He stated that his company had partially met this obstacle by one-man car operation. Mr. Lindsey, general manager of the Durham (N. C.) Traction Company, in discussing one-man operation reviewed operations in Durham and discussed types of cars and methods of fare collection. This latter topic also showed great diversity of opinion.

At the conclusion of the Friday session the visitors were the guests of E. H. Close, who took them on his private yacht to Put-in-Bay. On Saturday the delegates went to Cleveland on a special interurban car and visited the Cleveland Railway shops. The sixty new cars for the Toledo system being built at the Kuhlman shops of the Brill Company were also inspected.

#### TEN COMMANDMENTS FOR IMPROVING PUBLIC RELATIONS

One of the features of the convention was the suggestion of ten commandments to be observed by corporation men in their dealings with the public. This suggestion was made by Frank R. Coates and the commandments were as follows:

"A kind word quietly spoken will make friends.

"Take the public into your confidence. Lay all cards face up on the table.

"Give service that is everything that the word implies.

"Treat your employees and the public as you would be treated. Apply the Golden Rule in business.

"Remember we are all human and likely to err. Be patient.

"Keep your property maintained as nearly as possible to the 100 per cent standard.

"Officials should become connected with civic uplift bodies. Be an active member. Do your share of the work. Don't hesitate to let the public know you. Be one of them.

"Corporation offices should be devoid of red tape, and the doors should be open to the public.

"Don't keep callers waiting too long.

"Keep promises. Don't make any that you can't keep."

According to Waller B. Duncan, general manager of the Cumberland & Westernport Electric Railway, the good conductor is a mindreader. Mr. Duncan, who rose from conductor to general manager, was of the opinion that this was a necessary mental attainment. Some of his ideas were as follows:

When a passenger gets on, the conductor sometimes has to be a mindreader to sell tickets and prepare a transfer.

If he is acquainted with the men and women on the routes, he must know at which department store the women want to shop first and whether the men want to get breakfast or go to the barber for a shave before going to the office.

The mindreading conductor tells the hurried man he has forgotten his umbrella or the forgetful woman that her pocketbook is open. He must be a directory, timetable and show guide.

He should know where Mary Pickford is playing on that particular day and the chance for seeing the first inning at the ball park. Sometimes he holds the baby while mother gets out the tickets. He must be a fount of information. But mindreading is the most important part of his work.

### Company Section Exhibit at the Convention

The committee on company sections of the American Electric Railway Association made a very attractive exhibit near the Greek Temple on the pier at the recent convention, showing the lines of work and social activity followed by several of the sections. Framed groups of



BOOTH OF THE COMMITTEE ON COMPANY SECTIONS ON THE  
PIER AT ATLANTIC CITY

photographs, volumes of circulars and data sheets, etc., were attractively displayed. The booth, which was arranged to serve as the headquarters of company section members, proved to be a popular rendezvous, as is shown in the accompanying illustration.





R. C. GREEN



J. J. REYNOLDS



S. B. HARE



H. G. WINSOR

## Accident Prevention and Adjustment

Papers and Written Discussions Before Claims Association in Atlantic City, Oct. 9-12, Covered the Four General Topics of Compensation Laws, the Near-Side Stop, Automobile Accidents and Traffic Regulations, and Fundamentals in Claim Work

**T**HE ELECTRIC RAILWAY JOURNAL of Oct. 14, page 820, contained a report of the president's address and the proceedings of the Claims Association at the convention in Atlantic City on Oct. 9-12. According to the usual custom of this journal, the various papers read at the several meetings, together with the scheduled written discussions thereon, are presented in abstract this week on the following pages:



A. D. BROWN



E. P. WALSH



C. G. RICE

### Ohio's Compensation Act

BY R. C. GREEN

Accident Department, Cleveland (Ohio) Railway

**O**HIO passed its first compensation act May 31, 1911. The constitutionality of the act was attacked by a suit filed in the Supreme Court, the chief grounds being the taking of private property without due process of law and interference with freedom of contract. The court, however, decided the act to be constitutional.

Most innovations in their inception are crude, and in this respect Ohio's compensation act was no exception to the rule. This was an elective measure making it optional with the employer as to whether or not he would join the state fund, and his failure to make such an election denied him, in an action for personal injuries by an employee, the defenses of the fellow-servant rule, assumption of risk and contributory negligence. It provided for the payment of premiums by both employers and employees. Employers, however, were not to be stampeded, and out of a total of about 18,000 employers only 4000 became members of the fund. This attitude, of necessity, resulted in lack of funds, and it was apparent that before the act could become successful an amendment would be necessary, embracing the feature of compulsory membership.

This, however, could not be done until there was an amendment to the state constitution. Accordingly, in

1912 the constitution was amended, providing for compulsory contribution by employers to a state fund to be administered by the state. This was adopted by the people at a special election Sept. 3, 1912. In February, 1913, the General Assembly amended the act of 1911. The act of 1913 did not differ materially in principle from the act of 1911, except that it was compulsory and applied as well to public as to private employers of five or more workmen. An employer under the amendment who failed to contribute his quota to the state fund or, in other words, failed to become a member thereof, was denied the common law defenses of fellow-servant rule, assumption of risk and contributory negligence. Furthermore, an employee might, in lieu of an action for damages, file application for compensation with the board, and if the claim was honored and not paid by the employer a penalty was added. This forced employers to join the fund.



In view of a decision by the United States Supreme Court (*Noble State Bank vs. Haskell*), an Oklahoma case which provided that it was constitutional to levy an assessment against banks and thereby create a fund from which depositors might be reimbursed in cases of insufficient funds of insolvent banks, all doubt seemed to be removed.

#### DEFINING "WILLFUL ACT"

Under the act as it now stood, the employer was not protected if the injury was caused by the "willful act" of the employer or his agent, and up to this time there had been no legal interpretation of the words "willful act." The ambiguity of this phrase afforded a loophole for the damage lawyer, inasmuch as it became a question for the determination of the jury under the instructions of the court.

It fell to the lot of the Standard Boiler & Plate Company, a corporation doing business in Ohio, to be the martyr. A suit was filed in the federal court by an employee who had been injured. The cause of action was predicated upon the alleged "willful act," and the defendant set up by way of answer that it had paid its premium into the state fund and was therefore protected by the terms and defenses of the compensation act. The court charged the jury that willful negligence must amount to wanton negligence, or to use the language of the court, "the act complained of must have been such an act as to evince an utter disregard of consequences so as to inflict the injuries complained of." The jury returned a verdict of \$14,000, which was affirmed by the Court of Appeals of Cincinnati and paid.

At the reconvening of the Legislature, however, another amendment was passed defining "willful act" to be an act done knowingly and purposely with the direct object of injuring another. This stopped that sort of litigation, but did not restore to the Standard Boiler & Plate Company its \$14,000. Legal ingenuity aided by legislative ignorance had exacted its tribute and had been paid in full.

#### PAYMENTS UNDER OHIO LAW

In the event of an injury to an employee of an employer who has elected to operate under the act and paid his premium into the state insurance fund, it is the duty of the Industrial Commission to award to the injured employee, upon application and proof of his claim, an allowance for medical, nurse and hospital services and medicines, not exceeding in any instance the sum of \$200 and 66 2/3 per cent of the impairment of his earning capacity during the continuance of his disability, not to exceed a maximum of \$12 and not less than a minimum of \$5 per week, and if the employee's wages are less than \$5 per week, his full wages for a period of time not exceeding six years from the date of the injury, the aggregate amount of such payments not to exceed \$3,750. If the disability is permanent and total, the award is 66 2/3 per cent of the average weekly wage, to continue during the disability of the injured employee, with a maximum payment of \$12 per week. When the injury causes death within the period of two years after the injury and the decedent leaves no dependents, funeral expenses only are paid. If there are wholly dependent persons at the time of the death, the payment is 66 2/3 per cent of the average weekly wage, and continues for the remainder of the period between the date of the death and six years after the date of the injury, with a maximum and minimum of \$3,750 and \$1,500 respectively. If there are partly dependent persons at the time of the death, payments are made for all, or such portions of, the period of six years after

the date of the injury as the board in each case may determine, with a maximum of \$3,750.

#### DEALING DIRECTLY WITH EMPLOYEES

Under Section 22 of the act, employers of sufficient financial ability or credit to render certain the payment of compensation to injured employees, or to the dependents of killed employees, may deal directly with the employees or their dependents. Employers so electing are compelled to pay into a fund, provided for by the act, a sum equal to 10 per cent of their premium. This 10 per cent rate was to prevail until the fund totaled \$100,000, when it was to be reduced to 5 per cent. It has long since been reduced, as the fund is now approximately \$500,000.

At the time of the preparation of this paper, a suit was pending in the Supreme Court attacking the constitutionality of Section 22. It is contended that Section 22 is in contravention of the state constitution, which provides that all laws of a general nature shall have uniform operation throughout the state. It is further asserted that it conflicts with the fourteenth amendment of the federal constitution, which provides: "No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States, nor deny to any person within the jurisdiction the equal protection of the laws."

About 1200 of the large employers of labor throughout the state are paying the 5 per cent into the fund and compensating their employees direct. Out of a total of thirty-four street railways within the state, eleven being urban and twenty-three interurban, all of the urban lines are operating under Section 22 and twelve of the interurban are so operating.

In 1914 the premium of the Cleveland Railway, the largest street railway of the state, was \$49,519. A total of 5 per cent of this amount, \$2,476, was paid to the state, and to its employees in compensation it paid \$12,968, making a total cost of \$15,444. In 1915 5 per cent of the premium amounted to \$2,292, and to its employees the company paid \$6,700, making a total of \$8,992. This decrease was due to the fact that the number of accidents to employees was reduced 50 per cent in 1915 as compared to 1914. The estimated premium for the first six months of 1916 is about \$24,000, making the 5 per cent premium \$1,200. About \$3,500 was expended in compensation.

#### OHIO COMPENSATION IS SATISFACTORY

Because of the growth of the properties, it would be difficult to make any very satisfactory comparison with former years, but it is safe to say that state compensation is satisfactory to the street railways of Ohio and to their men. Compensation has resulted in a benefit not only to employers and employees, but to the commonwealth generally. Employees have been benefited in that they have received the compensation due them without having been compelled to divide it with some damage lawyer. Moreover, the ordinary juror of to-day regards himself as a sort of avenging hero whose duty it is to see how quickly and how thoroughly he can separate a defendant in a damage suit from his bank roll, never for one moment thinking that ultimately the consumer, "Mr. General Public," must foot the bill. He goes upon the theory that the defendant has some mysterious source of revenue. The saving, therefore, to the community also is generally of no small consequence.

#### LEGISLATION FOR INJURIES TO PUBLIC

Everyone will agree that this fixed statutory method of compensation is a step forward. It is a progressive



enactment, promoting prosperity and personal happiness. Am I stepping beyond the realm of reason, therefore, if I suggest that a legislative enactment, providing a fixed method for compensating those injured by public service corporations, would be beneficial? Is it any more fanciful or chimerical than the idea of state compensation twenty years ago?

The time may not be propitious for an innovation so radically divergent from the methods employed at present, but inasmuch as such a change can only be accomplished through the creation of a favorable public sentiment, it seems to me that it should be the sense of this organization, both individually and collectively, that it bend every effort toward the conversion of this idea into a reality, the undoubted result of which would tend to bring about a better feeling between this class of corporations and their patrons.

### Written Discussion

BY LEONARD J. TYNAN

Attorney Public Service Railway, Newark, N. J.

Personally, I like compensation law. I have always felt, and still feel, that it is logically unsound, but it is a wise provision for the state, for the courts, for the master and for the servant. And it has come to stay. The drift of legislation, however, will be to make the burdens of the law excessive. This inclination of our law-makers will have to be constantly watched. I know of no better safeguard in this direction than to fight to keep all classes of employers within the provisions of the law. Some of the states attempt to draw a distinction between hazardous employments and non-hazardous employments. This is an absurdity. The man who loses a leg does not much care whether he lost it making cheese or making dynamite. His remedy should be the same in either case. Whether an industry be non-hazardous or not, it should be kept within the law. If the hazard is low, the insurance against hazard also will be low.

#### COMPENSATION LAWS LEVEL GOOD AND BAD CASES

In states in which compensation laws are new, and while they remain new and untested in the courts, it is wise to have express written agreements between master and servant, if the compensation plan is adopted, providing that settlements made under the new law shall remain conclusive whether or not the law be upheld by the courts. This is a safeguard against possible confusion, for otherwise the nullifying of a statute, after many cases have been settled under it, would open up all the supposedly settled cases. Such a result would perhaps compel the employer to pay further damages in cases in which he had been negligent, without any hope of recovering back money paid in cases where he had not been negligent. It must always be borne in mind that the theory of compensation laws is the levelling up of all cases, good and bad, so that compensation is paid whether the employer be to blame or be absolutely innocent. In New Jersey, the only exceptions are those very rare cases in which the employee willfully and intentionally injures himself or commits suicide, and where the accident is caused by the intoxication of the injured person. And to meet the additional cases that must thus be paid for, there is a levelling down of the amount to be paid.

The man who loses a leg, for instance, cannot get a verdict for \$5,000 or so as he once might. In New Jersey, the compensation for loss of a leg is 50 per cent of daily wages during 175 weeks, with a minimum of \$5 a week and a maximum of \$10 a week. So \$1,750 dis-

tributed over a period of 175 weeks, or approximately three and one-half years, is the highest compensation that such a man can receive for the loss of his leg. There is, of course, something additional in that he will get 50 per cent of his daily wages while the wound is healing, and his medical expense for the first two weeks. Thus the reduced damages payable enable companies without undue strain to pay for the greater number of cases, although in the case of my company compensation as a whole is somewhat in excess of the charges for litigation and damages under the old system. Perhaps the difference is made up in the better relations that exist between company and employees. The bad blood and rancor of the old days have practically disappeared. Cases are almost always settled without friction, and men who would formerly leave our employ and hire a lawyer to sue us, now get better and go back to work.

#### POINTS ARISING UNDER NEW JERSEY LAW

In New Jersey, we have to be careful to get our rate of compensation properly adjusted, for the courts have held that over-payments will not, on adjustment, be credited to the payments due in the future, but that they will be considered as gratuities. In the early days of the law, we did some things which we would not dare to do now. I recall one case in which we loaned a poor fellow \$200 to get a cork leg, and then went into court and got a commutation to a lump sum of sufficient of his payments to enable him to repay to us the loan. In the present state of our law, we would not dare to do that, for the courts would hold that the injured man's weekly payments could not be commuted in order to pay a debt.

Occasionally a case arises in which commutation is an advantage to the injured party. Some times weekly payments over a considerable period will be commuted to a lump sum in order to enable him to buy a store or start in some small business. It is quite common to commute future payments to a lump sum for a widow who, with her children, is about to return to Europe. Such commutations are calculated upon a 5 per cent simple interest rebate basis. One of the odd features of our New Jersey statute is that in death cases, if a dependent dies, or if a widow re-marries, the right of such dependent or widow to compensation shall cease. Nevertheless, our courts, following the language of the statute, will commute future payments in death cases to a lump sum, and allow the widow and children to take that lump sum abroad, regardless of the fact that such commutation must be on a 5 per cent simple interest basis, and that no allowance is made to the employer for the chance of the widow marrying again, or for the possibility of the death of the widow and other dependents.

An interesting feature of our statute is the situation that arises when one of our workmen, while about our work, is injured by a third party. For instance, one of our conductors might be knocked off the running board of a trolley car by a recklessly driven automobile. In such a case, our New Jersey statute provides that we must pay compensation to the conductor for his injuries, but that any money recovered by him from the owner of the automobile shall be credited upon such compensation, and if we file a notice with the owner of the automobile, setting forth our position, such automobile owner could not settle with our conductor until he had first paid us, out of the money payable by him to the conductor, the amount which we up to that time had advanced to the conductor as compensation, or such part of said amount as the payment by the automobile owner to the conductor amounted to.

Our statute contains a great deal about agreements



between the parties. For instance, it contains a statute of limitations, that unless an agreement be made, or a petition for compensation filed, within a year, the injured party will be too late. Now, as a matter of fact, agreements are seldom made in injury cases. They are in death cases, because there the amount can readily be fixed, but injury cases depend upon the length of time required to heal the injury. Our usual practice in such cases is to begin payments at the end of the first two weeks, during which time we pay only the medical expenses, and to continue the payments until the injured man goes back to work, of course having due regard for the statutory limitations as to the time that payments shall continue. The limitation for temporary disability is three hundred weeks. The limitation for disability total in character, and permanent in quality, is four hundred weeks. The limitation in death cases is three hundred weeks.

In New Jersey there is no obligation to the employer to insure for the benefit of injured workmen. I am inclined to think that such insurance should be required from all employers, except those who are able to prove their solvency to the satisfaction of the state authorities. Where insurance is required, a momentous question is whether to insure in a private company or in a state fund, which the states requiring insurance are providing, or to carry one's own insurance, depositing insurance with the state as a guarantee. The state fund is usually safer insurance than that of a private stock company, because in some states, at least, insurance in a private stock company only relieves the employer if such private stock company makes good, while insurance in the state fund is an absolute and final relief to the employer. It must be remembered that, under the laws of some of the states, these weekly compensation payments have, in some cases, to be continued over a period of many years. An insurance company which is at present perfectly solvent, may, ten or fifteen years from now, get into financial difficulties, and the burden that it had undertaken, and could not carry out, would be returned to the shoulders of the employer that had trusted it.

#### ADMINISTERING THE LAW

In New Jersey, we consider ourselves fortunate in being able to administer the law ourselves. This would be more difficult where insurance was required. The advantage of an employer dealing directly with his workmen is that it gives a chance for good feeling and sympathy to develop between the master and the servant. Our settlements are all reported to a State commission, and the settlement is not considered conclusive until this commission has approved of it. The commission also undertakes to bring parties together where misunderstandings exist, without the intervention of lawyers and with as little expense and delay as possible. Where the parties fail to agree, the commission can order the matter into court for a hearing. A very small percentage of our cases reach the court. Occasionally we are compelled to go there because of unreasonable demands by the injured party, or because some legal question concerning the case may arise, which can only be settled by a court decision.

Under our New Jersey statute, we are supposed to supply medical aid to the injured man for the first two weeks. Of course it is sometimes an advantage to ourselves to supply such aid for a longer period, as it pays to get the man well and back to work as soon as possible. The injured party must accept the medical aid which we tender. If he insists on getting his own physician, we do not consider ourselves responsible for such physician's bill unless, of course, we approve of his being

hired in the first instance, which, as a matter of fact, we sometimes do.

We have some difficult problems to decide in the administration of the statute. A watchman is set to guard a trench which we have dug in order to locate a leaking gas pipe. At four o'clock in the night, he tells a policeman that it is cold; he wishes he had his overcoat. Two hours later he is found dead, sitting at the bottom of the trench. He died from gas asphyxiation. There is no evidence that the guards about the trench have been disturbed. There is nothing to show that he fell into the trench. Did he die while performing his duty, or did he die while neglecting his duty to take a nap? The welfare of three or four little orphan children depends upon our decision in this matter.

A conductor on our trolley car is hit in the eye by a stone which a boy threw. The stone first hit the wire gate, and then bounced off against the conductor's eye. If the stone was not thrown intentionally at the conductor or the car, then getting in range of the stone was merely one of the incidents of travel in the street, and was not one of the hazards peculiar to the conductor's employment. If the stone was thrown at the conductor, it was merely one of the ordinary hazards of the street. If the stone was thrown at the car, or at the conductor because he was in charge of the car, then it was an extraordinary hazard due to the conductor's employment. As we could not find the boy who threw the stone, it was difficult to ascertain whether we should, or should not, recognize the claim of the conductor for the loss of the eye.

#### SETTLING WITH DEPENDENTS

It is important in death cases to get signed statements from the decedent's relatives as early as possible. Our New Jersey statute provides for a varying percentage of compensation in death cases, the percentage depending upon the number of dependents left by the decedent. If the relatives of a decedent are carefully approached before they are acquainted with the intricacies of the law, they are likely to tell the truth. After they learn from some lawyer what the requirements of a dependent are, they cannot so well be relied upon. Sometimes the desired information can best be obtained by back-handed action. If we say to the father of a man who has been killed—"Why, your son supported you, didn't he?"—he will become indignant, and will say: "No, indeed, I am quite able to support myself; he never did anything for me." Then is the time when you want him to put the statement in writing and sign it.

We recently had a case of a conductor who came from North Carolina and was killed at his work. We located his people, had the body shipped to his home, paid \$100 toward the funeral expenses and had an interview with the father, who came North to our office to talk over the matter. The father signed a statement to the effect that the boy was single and had no dependents, and that while he occasionally sent money home to his sister, the father did not know how much. Later on, this father hired a lawyer, and the case got into court. We lost it. Despite the father's statement that the son had no dependents, he testified that the son sent him money every few weeks, \$15 or \$20 at a time, and that he, his wife and daughter had great trouble in getting along without this money. When questioned about the signed statement that he had made, he was prepared to argue about the meaning of the word "dependent," and said: "I meant by that to say that we did not entirely depend on the boy, that I earned something." We lost the case, but we learned a lesson. We seldom use the word "dependent" any more.



Just now we have the case of a colored man who was killed. He was single and childless. His father was in our office recently and made a statement about his boy. We did not ask him whether the boy had anybody dependent on him. Instead of that, the father made, signed and swore to a statement before a witness, that since the boy left home last Christmas, he had not sent any money home except a present of \$15 to his mother. That colored man will have hard work to argue aside the expression, "had not sent any money home."

This question of dependency in death cases gives us considerable trouble. Sometimes, in case of the death of a single and childless man, his entire family circle, father, mother and sisters and brothers, whether adults or not, are held to be dependent upon the decedent, on the theory that the family fund has been depleted by his death. For instance, in a recent case, a single man aged thirty was killed in an accident. His earnings were approximately \$12 per week. He left a father whose weekly earnings were \$22, a sister whose weekly earnings were \$7, and a mother who was janitress of the house in which the family had its home and got some allowance from the family rent because of her service. All moneys were paid to the mother. She spent it all for living expenses, except some small amount for life insurance.

Here a very pertinent question was as to whether the decedent in his contribution to the family fund contributed more than he consumed. Calculations were made on different theories, and they all were very close; but the court held that the decedent's contribution to the fund was in excess of what he consumed from the fund, and so held that the father, mother and sister were all dependent upon the decedent and were all entitled to compensation for his death.

One of the distinctions made in that and another case recently decided in New Jersey, is between decedents who are more than twenty-one years of age, and decedents who are under that age. In both of these cases it was decided that, in regard to those under twenty-one and single, the father is entitled to all their earnings, and therefore is the only person dependent upon them. When the decedent is more than twenty-one, his contribution to the family fund is assumed to be voluntary on his part, and all beneficiaries of that contribution, within the prescribed limits of relationship, are held to be among his dependents.

#### DEALING WITH MINORS

A doubt has arisen in our courts as to the applicability of our statute to persons under twenty-one years of age who have parents. The theory is that the parent is entitled to the service of the minor, that a contract of hire made by a minor is really made by him as the agent of his parent, and that when the law attempts to force into such contract a compensation provision that may under some circumstances greatly reduce the minor's recovery of damages for injuries, the minor, being the injured party, should not be bound by the provisions of a contract which was not really made by him or in his interest, but was, in law, made by the parent and in the parent's interest.

This matter has not as yet been thoroughly threshed out in the courts. In New Jersey, where the compensation provision is an implied feature of the contract of employment, I feel that the parent should not be able to bind the minor so that the minor could not sue for his injuries, when the contract is not that of the minor but rather that of the parent. In New York, where the compensation provision is not contractual but automatically follows the fact of employment, the same subject may arise on a different theory, to wit, that the minor is not employed. It is really his parent who is employed and

who is using the minor as an instrument to perform the work. It may, therefore, in the end be held that the minor is in the same position as a bondman or slave, and it may possibly follow that the courts will hold that he is not subject to the provisions of the compensation law.

In New Jersey, in a recent decision, a child under fourteen years of age was put to work. He claimed to be injured through the negligence of his employer, and brought an action at law for damages. When the employer set up as a defense the workmen's compensation statute, the court held that, as our factory law forbade the employment of children under fourteen, and as our legislature in enacting the compensation statute clearly intended it to apply only to lawful employees, it could not be held to apply to the case of a child under fourteen. Of course, this decision has enabled the child, through its proper representative, to proceed with its suit for negligence, but what will the court do when a similar case arises in which there is no negligence, and a child of tender years asks for compensation under the workmen's compensation act? It happens that the decision, as recently promulgated, will probably work out for the benefit of the child. The same logic, in a case where no negligence of the master existed, would work to the detriment of the child.

## The Near-Side Stop

BY JOHN J. REYNOLDS

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**T**OPOGRAPHY probably stands first among the obstacles which have retarded the fullest development of the near-side stop. Where irregularity of street intersections exist, the near-side stop is impracticable. A very large percentage of railway men, however, favor the near-side stop. Indeed, so completely has this stop satisfied them that they would not willingly return to the old method of the far-side stop. It seems reasonable, therefore, to believe that if all those companies which are not prevented by the condition of the layout of streets, or by municipal ordinance, were to adopt the policy of extending the near-side stop as much as possible, and above all of advocating it, not only on the strict safety-first ground but also upon those other and very substantial economic grounds indicated by those who have made a careful study of the subject, we would, despite all skepticism, begin a new era in the development of accident prevention.

There are four principal influences which encourage belief that the near-side stop will ultimately be adopted, as far as possible, on all railway systems of any size: (1) Safety of operation; (2) lower maintenance cost; (3) greater regularity of schedules, and (4) a saving in power. Economic reasons will one day place this stop in the operating policy of efficiently managed railways, just as economic reasons brought about the adoption of those types of car which are to-day recognized as instrumentalities of safe, efficient and economic operation.

#### REDUCES OPPORTUNITIES FOR ACCIDENTS

The near-side stop does not leave open the same opportunity for accidents that the far-side stop does. For instance, it is obviously less difficult to control the speed of a car when it is accelerating after a service stop on the near side of the street than it is to do so while it is being braked for a service stop on the far side of the street. Many passengers are thrown in cars which make the far-side stop on account of very abrupt or short stops due to the motorman being sud-



denly surprised by a pedestrian, team or other vehicle unexpectedly coming out of intersecting streets. Not only does this cause accidents to passengers, but its effect on the brakes, shoes, wheels and general car equipment is very damaging.

Accidents of this character would be prevented, or very greatly reduced, by the near-side stop, because the motorman would have a chance to observe fully the movement of street traffic before crossing and to avoid that "hitching along" due to vehicular interference and other traffic. This practice of "hitching along" is peculiar to the far-side stop, and is responsible for the partially set or "dragging" brake habit, so common with present-day motormen, as the brakeshoe and power cost items of maintenance will show. Maximum acceleration and braking to the limit of adhesion on the rail, practices causing discomfort as well as accidents to passengers and increased maintenance cost, may also be fairly charged to the far-side stop. Moreover, with the near-side stop passengers generally alight from the front end of the car, thus eliminating that class of accident where passengers step from behind the car and in front of a car traveling in an opposite direction on the other track.

Various reports of association committees have shown how the near-side stop has been increasingly adopted by member companies and what its advantages are, while these facts have also been discussed in the proceedings and reports of safety organizations and the technical press. \* \* \* In order to get for this paper some statistics that would be conclusive in favor of the near-side stop, approximately 100 letters were sent by the writer to the claim departments of as many railway companies. Answers were received from more than 60 per cent, but, unfortunately, comparatively few companies furnished any statistics. Apart from the absence of statistics, however, there was a practically unanimous opinion by thirty-five companies that the near-side stop tends to prevent accidents. \* \* \* In other words, those companies know from actual experience that the near-side stop does prevent accidents, although most of them are without figures to demonstrate it. It is submitted, therefore, that the non-existence of statistics is of no consequence as an argument against the near-side stop. Moreover, it is believed that no sufficient evidence of opposition to this stop has been disclosed by the inquiry to warrant its recital in this paper. It is significant that several companies have requested a return to the near-side stop, where it had been done away with.

Somewhere beyond the ocean of impossibility and the shifting sands of the improbable, is a shore upon which claim men may safely land in their quest for information to establish facts so generally believed to exist and yet apparently so incapable of mathematical demonstration. A statistical classification will one day, I hope, give us such a shore, from which we may be able to procure incontrovertible figures to back up or disprove the efficacy of just such institutions as the near-side stop.

### Oral Discussion

BY SAMUEL B. HARE

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The testimonials from companies operating under this system, the gradual increase of the percentage of the companies adopting the near-side stop and the unanimous opinion that it is the better mode of operation and that there will be no return to the old system, are self-evident facts that the near-side stop has come to stay. In

our opinion it is the greatest safety device that has been adopted for the protection of passengers, pedestrians and vehicular traffic.

#### 1. *Passengers in Cars:*

A great majority of the people on a street car arise and go to the front end of the car at the street where they desire to get off as the car is gradually coming to a stop, with the result that at most every corner many persons will be standing immediately before the car stops. Should, therefore, the car be brought to a smooth stop, as is most frequently done with the near-side stop, there is no confusion and the standing passengers are discharged without trouble. When the far-side stop is used the car is passing the intersecting street; if a vehicle or pedestrian suddenly approaches the car, it is necessary for the motorman to make a quick stop, with the result that the passengers standing in the aisle are often thrown or struck.

#### 2. *Boarding Accidents:*

When a car has stopped at the near side, the passengers board the car some distance from the corner of the intersecting streets and on the right side, this in reference to prepayment cars. Almost every municipality has an ordinance requiring vehicles following a car to stop and not pass the street car while it is taking on or discharging passengers, and the very fact that the car is being brought to a stop is a signal to following traffic, making it possible for the passenger to occupy the street and board the car with greater safety to himself.

When the far-side stop is used, vehicles going at right angles turn to the right at an intersecting street and traverse the spot where a person must necessarily stand to board a car. In the case of reckless drivers of vehicles, the position that the person must be in to board the car makes an accident quite possible. No vehicle turns directly left at an intersecting street, it being a universal custom to cross over to the right side, and the position of the car at the near side is a guard and protection to all the individuals who are about to board it.

#### 3. *Alighting Accidents:*

When a car stops at the near side and a passenger alights from the front to the right, the opportunity is afforded to look for an approaching vehicle or obstruction. There need be no apprehension of accidents from any direction but the rear, and in that direction the passenger is protected as stated. Should the passenger, after alighting, desire to cross to the left side of the street, there is the opportunity of seeing the traffic on the highway before starting across. It has become the custom in such cases for the passengers, after alighting, to wait until the car has started before going across the street.

#### 4. *Pedestrians:*

Inhabitants of a municipality soon learn the method of operating of cars and when it is known that cars will stop at the near side, the street can be crossed by a pedestrian with greater safety. As he comes to the edge of the property line he sees the car approaching and its speed indicates that it is about to stop; or, if the car has stopped and is taking on or discharging passengers, he knows it will remain still until all have been taken on or discharged. He knows that all vehicular traffic, moving in the same direction with the car, has stopped at the rear of the car. Nothing can obstruct his view and he sees that traffic coming in the opposite direction has also stopped, and he has a right



to believe that the ordinance pertaining to the passing of street cars will be observed by the drivers of vehicles. On the other hand, should the car proceed to the far side and the pedestrian, as it starts, cross the street, the position of the car will obstruct his view and there is a possibility of being struck by a vehicle coming in the opposite direction.

#### 5. Vehicular Accidents:

When a car comes to a near-side stop at intersecting streets, the line of vision of the motorman extends to the right and left a distance of at least 120 ft., and he is able to see in both directions any approaching vehicle, and the car can be seen by the drivers of these vehicles for a like distance. In the more congested districts the signal of the traffic officer controls the starting and stopping of traffic and few vehicular accidents occur at these places. Yet, in other districts, in the absence of the officers, the motorman of the car and the driver of the vehicle are the ones to control the operation. If, therefore, the car stops at the near side it would seem impossible that an accident could occur, unless through the gross negligence of one of the parties. There is no prevention or safety device or hope for the absolutely careless and reckless driver. Where the far-side stop is used the operator of the car must have his car in motion to cross the street, and that motion carries him sometimes quickly beyond the street line and into a collision.

#### 6. Traffic Squads:

Inquiries from traffic squad officers, patrolmen and cornermen have brought forth the opinion that the movement of traffic is facilitated by the use of the near-side stop. These officers have stated that vehicles and pedestrians are protected, that there is a greater co-operation between the operators of the street cars and the traffic squad by the use of the near-side stop than otherwise, and that officers thereby have less trouble in regard to handling the traveling public to cross the streets.

#### 7. Accommodation to Public:

Every accident or collision means the stopping of the car, the examination of the damage done, the procuring of the names of witnesses, the clearing of the track, etc. Aside from the possible fright and injury to passengers, they are inconvenienced in the meeting of important engagements. It needs must follow that anything that leads to accident prevention means the removal of that which is inconvenient to the traveling public.

#### 8. Character of Accidents:

While all forms of accidents have not been eliminated by the near-side stop, there has been a marked decrease. With a decrease in number, we also have a corresponding decrease of the accidents of a more serious nature. This result is, no doubt, obtained by reason of the fact that at intersecting streets the car is stopped in front of the impending collision, and all parties concerned have but to use their eyes intelligently to avoid that which under the circumstances of the far-side stop could not have been avoided. It is a significant fact that every motorman is in favor of the near-side stop, and we have been unable to discover any railway line that has once adopted this stop to have returned to the old method. It, therefore, can be safely stated that the installing of the prepayment cars and the adopting of the near-side stop are the two most important and beneficial safety devices known to street railway operation.

## Motor Vehicle Accidents and Traffic Regulation

BY H. G. WINSOR

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IN the consideration of the first part of the subject, "Motor Vehicle Accidents," let us observe first what the development of motor vehicle traffic has been during the last few years and what effect this development has had upon the electric railway claim business. As an indication of the progress which has developed in the motor vehicle industry during a period of ten years, it may be said that the number of automobile registrations in 1905 totaled 24,051 for nine states, while in 1910 they amounted to 414,678 for twenty-six states and in 1915 to 2,297,843 for forty-two states. For the nine states having records back to 1905, the percentage of increase in the 1905-1910 period was 340 per cent and in the 1910-1915 period 471 per cent. The twenty-six states whose record of registrations in 1910 showed 414,678, in 1915 registered 1,886,116 motors, an increase of 355 per cent. At the same rate of increase during the five years ending in 1920, these twenty-six states will have registered at that time 6,695,711 motors, and in the forty-eight states nearly 10,000,000 of motor vehicles will be in use. It is probable, however, that the rate of increase recorded during the last five years will not be maintained, as the automobile industry will have more nearly reached a point of saturation. A very conservative estimate would place the number at 5,000,000, which with a population of 110,000,000 would allow a motor vehicle in operation by one person in every twenty-two, one adult person in every six being licensed to operate a high power motor in the public streets.

#### HOW COLLISIONS HAVE INCREASED

In order that we may have a comprehensive idea of the effect this phenomenal increase in motor vehicle traffic has had on the problem of vehicle accidents, let us now consider the increase in collisions in which street and interurban cars were involved. The record on page 875 for twenty-five cities shows the number of cars in service, the number of car-miles operated, the total number of vehicle collisions and the number per 10,000 car-miles operated, during the years 1911 and 1915, with the percentage of increase or decrease in each case. In the arrangement of this record, cities are divided into classes, as follows: Class A—cities where 800 or more cars are operated; Class B—cities where 400 to 800 cars are operated; Class C—cities where 200 to 400 cars are operated; Class D—cities where less than 200 cars are operated, and Class E—interurban lines.

A careful analysis of these figures shows that while the increase in traffic has been phenomenal, electric railways have up to this time succeeded in keeping the percentage of increase in collisions between cars and motor vehicles within reasonable bounds. The record is certainly creditable and worthy of commendation, but can this record be maintained? What of the much greater number of street accidents in which the cars are not concerned? Single-handed, we have but little influence over the control of traffic conditions.

#### TRAFFIC CONDITIONS LEADING TO ACCIDENTS

In the thickly populated portion of one of the largest cities, a check was made recently for the purpose of observing the people who during the period of one hour entered upon the traveled portion of the streets under observation in such a manner as to place themselves in a position of danger. The three persons who made the



experiment traveled in an automobile 12 miles in the hour and the following interesting table resulted:

Children passed who were roller skating.....	237
Children passed who rode bicycles.....	116
Children passed who were playing ball.....	98
Children passed who were playing other games.....	74
Nursemaids who wheeled baby carriages.....	53
Men who looked in our direction before crossing streets.....	91
Men who did not look in our direction until aroused by loud sounding of horn.....	152
Total .....	1,163

One of the party conducting this investigation said: "All of these 1163 men, women and children had placed themselves within easy striking distance of our car, and each demanded from every driver near him a certain amount of care and consideration. There were

TABLE SHOWING INCREASE IN COLLISIONS WITH VEHICLES

	Year	Num-ber of Cars	Car-Miles	Vehicle Colli-sions	Collisions per 10,000 Miles
<b>Class A:</b>					
Public Service Railway	1911	1,300	44,561,141	5,013	1.12
	1915	1,375	51,194,087	5,295	1.03
Cleveland Railway	1911	967	27,851,112	4,249	1.52
	1915	1,375	34,158,776	7,047	2.06
Boston Elevated Railway	1911		46,123,852	3,933	0.85
	1915	1,250	45,711,578	3,135	0.69
United Railways of St. Louis	1911	1,015	540,01,181	5,440	1.34
	1915	1,086	42,305,802	4,893	1.15
Detroit United Railway	1911	850	27,059,465	4,672	1.73
	1915	1,000	33,500,941	8,325	2.48
Five companies—average collisions per 10,000 car miles.....					1.31
					1915..... 1.48
					Increase..... 13 per cent
<b>Class B:</b>					
Los Angeles Railway	1911	566	24,159,824	4,278	1.77
	1915	704	29,542,701	5,437	1.84
Minneapolis Street Railway	1911	444	15,028,319	1,347	0.90
	1915	606	18,031,328	2,379	1.32
International Railway.....	1911	599	22,228,176	1,597	0.72
	1915	561	22,119,054	1,631	0.74
United Railroads of San Francisco.....	1911	539	22,077,429	2,821	1.28
	1915	597	24,632,749	4,766	1.94
New York State Railways.....	1911	462	11,881,054	1,496	1.26
	1915	559	11,531,730	1,701	1.48
Milwaukee Electric Railway & Light Company.....	1911	442	17,244,497	1,307	0.76
	1915	540	17,437,171	2,149	1.23
Capitol Traction Company, Washington Railway & Electric Company.....	1911	510	18,463,790	1,737	0.94
	1915	536	18,514,483	1,411	0.76
Seven companies—average collisions per 10,000 car miles.....					1.09
					1915..... 1.33
					Increase..... 22 per cent
<b>Class C:</b>					
Portland Railway, Light & Power Com-pany.....	1911	404	12,264,618	964	0.79
	1915	365	14,999,001	1,724	1.15
Puget Sound Traction, Light & Power Company.....	1911	361	12,730,740	1,012	0.80
	1915	358	12,662,487	1,789	1.41
San Francisco-Oakland Terminal Rail-ways.....	*1913	338	16,399,409	933	0.57
	1915	333	16,447,519	1,161	0.71
Rhode Island Company.....	*1913	220	13,606,092	1,089	0.80
	1915	215	16,382,610	1,949	1.19
Indianapolis Traction & Terminal Com-pany.....	1911	228	9,655,103	1,095	1.03
	1915	239	10,370,785	1,253	1.21
Five companies—average collisions per 10,000 car miles.....					0.82
					1915..... 1.14
					Increase..... 39 per cent
<b>Class D:</b>					
Omaha & Council Bluffs Street Railway	1911	153	9,537,552	**212	0.22
	1915	171	10,431,444	**270	0.26
Denver City Tramway.....	1911	170	10,888,780	869	0.80
	1915	150	9,778,055	851	0.87
Columbus Railway, Power & Light Com-pany.....	1911	150	8,459,395	714	0.84
	1915	134	8,204,525	872	1.06
Memphis Street Railway.....	1911	131	7,277,396	1,830	2.51
	1915	125	7,690,462	666	0.87
Bay State Street Railway (Fall River Division).....	1911		2,696,829	188	0.70
	1915		2,981,834	271	0.91
Tacoma Railway & Power Company.....	1911	96	4,028,994	163	0.40
	1915	97	4,111,893	269	0.65
Grand Rapids Railway.....	1911	67	4,016,462	290	0.72
	1915	72	4,305,987	2,045	4.75
Washington Water-Power Company.....	1911	59	3,634,400	128	0.35
	1915	59	3,293,540	68	0.21
Eight companies—average collisions per 10,000 miles.....					0.82
					1915..... 1.19
					Increase..... 45 per cent
<b>Class E:</b>					
Pacific Electric Railway.....	1911	560	16,964,784	828	0.48
	1915	675	31,864,470	1,448	0.46
Terre Haute, Indianapolis & Eastern Traction Company.....	1911	53	4,660,339	97	0.21
	1915	61	5,233,532	184	0.35
Puget Sound Electric Railway.....	1911	11	1,364,509	35	0.26
	1915	11	988,701	51	0.52
Indianapolis & Cincinnati Traction Com-pany.....	1911	11	1,559,081	34	0.22
	1915	11	1,443,807	37	0.26

\*No previous record.

\*\*Collisions resulting in claims.

times when a score or more of those just listed were counted within 100 ft. of our car, which was going ahead at a speed well within its legal rate." Such a condition as this is not confined to any particular city or locality, but is only an example of what exists wherever traffic conditions are congested.

The public does not exhibit reasonable care while traveling over the highways. Moreover, it is an undisputed fact that immunity from the operation of the present admittedly inadequate laws is extended in many cases and serves to encourage the motoring public in their disregard of the rights of others. The indiscriminate licensing of automobile drivers as at present in many states is also without doubt an extremely dangerous practice. This is, of course, not apparent in some states, Massachusetts, Connecticut, New Jersey and Minnesota being among those that have very good laws intended to protect the public by licensing only those who are physically and mentally capable. I am not prepared to say whether or not these laws are enforced, but protection in this regard should be given the public in every state.

Credit should be given experienced chauffeurs for the part which they play in the game of chance which is going on continually on the streets and highways. They, in nearly all cases, handle their motors efficiently and carefully, with due regard for the rights of others, and are seldom concerned in accidents. The proper description of a chauffeur, as given in a recent publication, is "One employed to prevent pedestrians and children from committing suicide."

#### REGULATING TRAFFIC

Frank Upham Adams in the April issue of the *American Magazine* has an article which describes street problems which are arising and suggests: (1) The restriction of the operation of automobiles to those mentally and physically equipped for this responsibility. (2) The strict enforcement of state-wide laws fixing speed limits. (3) The legal restriction of pedestrians to the proper use of streets. (4) The absolute prohibition of streets as playgrounds for children and others. While the enactment and a strict enforcement of such laws would admittedly bring about the desired condition, there is a serious question as to whether legislative bodies could be prevailed upon to enact such laws, and if successful in securing their enactment, whether it would be reasonable under present conditions to expect a rigid enforcement.

#### 1. Restricting Automobile Operation:

With reference to the first suggestion, that of restricting the operation of automobiles, there is no question concerning the urgent need of immediate action in every state where indiscriminate licensing is allowed. In a recent discussion on this subject at the Pacific Claim Agents' Association convention, a comparison was drawn between the requirements of a locomotive engineer who must serve a number of years before being intrusted with the operation of an engine, and the automobile driver who only requires a few hours instruction from a salesman, whose sole desire is to make a sale. On the one hand, the railway superintendent has the interest of both the public and his employees at heart; and on the other, the salesman has a purely selfish motive and no thought or responsibility concerning what may happen as a result of his purchaser's inexperience or temperament.

#### 2. Enforcing Speed Laws:

The second suggestion could probably be worked out in a satisfactory way as far as the framing and passage



of suitable laws are concerned. The difficulty, however, is in the enforcement. While the traffic officer has been successful in bringing about order and compliance with regulations at street intersections, his useful influence, unfortunately, does not extend beyond the limit of his vision. The motorcycle officer soon becomes known to those who care little for speed laws, and while arrests are frequent, it is getting to be quite the fashion to be arrested for speeding and have your case placed on file with the admonition, "Don't do it again." Lack of sufficient funds is another obstacle which seriously interferes with the enforcement of speed laws, and is usually pleaded by the authorities when their actions are criticized.

A rather novel experiment has been proposed in California which is intended to aid in the observance of the "Stop, Look, Listen" regulation. Authority has been asked of the Public Service Commission to install so-called "Thank you, ma'ams" or depressions in the highway at a certain distance from steam and interurban railroad crossings for the purpose of forcing automobiles to reduce their speed. I am told that such a plan is or has been used in the State of Ohio. The attorney-general of Oregon has rendered an opinion that such action would be illegal, and that any damage occasioned as a result could be recovered from the county in which the accident occurred. A reasonable requirement in my estimation would be for automobiles to stop before approaching within, say, 50 ft. of a crossing and to reduce their speed to not more than 10 m.p.h. at a distance of 100 ft.

### 3. Restricting Pedestrian Travel:

Mr. Adams, in his third suggestion, has covered a wide field. If plans or laws could be devised and successfully prosecuted which would influence pedestrians to the proper use of streets, an immense amount of suffering would be avoided and many lives saved. It is a condition well worth striving for, but it seems to me that only a small part of this accomplishment could be brought about by legal measures. You might by law or ordinance require a person to cross the street in a certain way and only at street intersections, but there are so many possibilities during the act of crossing that it would be impossible to remove the individual responsibility or the danger involved in the act. To my mind, simple but well defined laws are all which we could expect to enforce with regard to control of pedestrians. We should bend our energies to the education of the public in safe practices and the matter of caution in the use of the streets.

### 4. Prohibiting Street Play:

Not the least important is the fourth suggestion—the absolute prohibition of streets as playgrounds for children and others. With the advent of extensive asphalt streets and the natural desire of children to use them for roller skating, wagon coasting, ball playing and other sports, an especially dangerous traffic condition has been brought about. Many children are so poorly housed that they practically live in the streets. To refuse them the privilege of playing in the traveled portion would indeed be a hardship. Yet, with the startling record of serious and fatal accidents to little ones engaged in street play—a record which is multiplied year by year—some action must be taken to protect them from the results of their own carelessness and the negligence of their parents. Just how stringent the required legislation should be depends in a measure upon local conditions. The principle involved, however, should be considered in all cases, and such laws as are enacted should be enforced.

While giving consideration to such legal regulations as seem necessary, we should not forget our duties or opportunities along educational lines. In this phase of our work, no better field can be found than in the public school. In our city the plan of lecturing to pupils during the school year has been elaborated upon, and we now have a working safety organization in each school building, assisting in the enforcement of safety rules and practices and working out well defined plans to conserve the lives and health of not only themselves but also their relatives and friends and the public generally. One of the results of this effort on our part has reduced street playing 50 per cent, and within the next two years we expect practically to eliminate the habit. These children of school age, who are known to us as "Safety Scouts," have taken up the work with an enthusiasm which is surprising, and their keen conception of what benefits can be derived from their efforts, acts as an inspiration to every one who observes it. As our traffic problems of the future must be solved by these same boys and girls, our energies in teaching them the principles of care and caution will serve effectively to build up a sentiment for the conservation of mankind.

### OTHER POINTS NOT TO BE OVERLOOKED

As to the enactment of other laws which are of importance, there are a number which should not be overlooked. On pages 57 and 58 of the Proceedings of our 1915 convention, you will find a proposed statute submitted by Russell A. Sears, Boston, Mass., which it was intended should be introduced at this year's session of the Massachusetts legislative bodies. This has a great deal of merit and should become effective in every state. This proposed statute defines the meaning of and establishes so-called thoroughfares and regulates the operation of vehicles upon and entering such.

Uniform laws governing the positions of slow and rapidly moving vehicles, passing and overtaking other vehicles, lights and dimmers, turning at street intersections and the parking of idle cars should be considered with a view of securing such changes in existing laws and the passage of such laws as are needed in addition to enable operators of automobiles to understand clearly just what is required of them, not only in the state where they reside, but in any other state which they might enter. There is fully as much violation of traffic laws through ignorance of their requirements as through wilful acts.

## Written Discussion

BY A. D. BROWN

Claim Agent New York State Railways, Syracuse, N. Y.

Laws should be enacted prescribing regulations and restrictions that will prevent the indiscriminate licensing of drivers of high-power motor vehicles. There should be certain qualifications necessary, such as age, physical fitness, habits, etc., before a person, owner or otherwise, is allowed to drive a motor vehicle upon the public streets and highways. Such laws should be rigidly enforced, and the public should co-operate with the state, county and municipal authorities in enforcing them.

There should be a standardization of road signs and signs and signals at grade crossings, and in order to perfect such a standardization, the municipal, county and state authorities, railways and automobile associations must co-operate. With standard signs and signals at grade crossings to warn the motorist of danger, then some regulations should be imposed by law that he either stop before crossing the track or else limit the speed of his car so that he could stop in case it became necessary to avoid a collision.



There should be a like co-operation to enforce existing laws and ordinances and to secure uniform state laws to govern the rate of speed in rural districts and in incorporated villages and cities. Municipal ordinances governing speed, line of travel, safety zones, passing standing cars, etc., are not uniform. This state of affairs cannot be other than confusing to the most careful tourist as he passes from one municipality to another.

Many motor vehicle accidents are not the fault of the drivers of such vehicles, but are rather due to the carelessness of the public in general, and many of these accidents may be prevented by the education of the public as to safety first. Railroads have been pioneers in this movement, but it must be carried on further and railways, automobile associations and other organizations interested in the problem of prevention of accidents, should endeavor to bring about the actual introduction into our public schools of a system whereby the youth of to-day will receive, as a part of his or her education, a thorough course of instruction by lectures or otherwise on accident prevention.

## Claim Work Fundamentals

BY E. P. WALSH

Attorney United Railways, St. Louis, Mo.

THE claim agent of other days found his tasks comparatively simple. In the days when cars and all other vehicles using the streets were drawn by animals, accidents were few and usually of a not very serious character, but because some accident did occur the claim agent was tolerated as a necessary evil and was generally considered by his employer as a constant source of expense from which no compensatory returns were received.

That condition is now materially changed, however, and to-day the claim agent is considered as a respectable part of the company organization. His task, however, is none the less difficult, and I see no prospect of his being able to recline upon a bed of roses in the immediate future. The hazard of accident is greater to-day than it ever was. Horse-drawn vehicles are diminishing in number, while those driven by motor power are greatly increasing. The claim agent of the future must be the man who will not only speedily and efficiently take care of and minimize, as far as possible, the ill-effects of accidents that happen, but will be most far-seeing in his ability to devise ways and means whereby accidents may be avoided.

### POLICIES AND PRINCIPLES

Street railways are confronted with a twofold task, the education of the employees upon the one side, and the education of the public upon the other. Every mechanical appliance that would seem to tend toward the avoidance of accidents has been employed, and yet our experience has convinced us that the most perfect mechanical appliances are almost nil in their effect unless they are handled by men who are educated and trained to be careful. The healthy, happy, comfortable, satisfied employee does the best work and is the safest custodian of the company's equipment. In order that these conditions may prevail among employees, our various companies have established for them welfare associations, building and loan associations and employees' mutual benefit associations, and have provided times and places of enjoyment that demonstrate more forcibly than mere words could tell the mutual interest and co-operation between employer and employee. These conditions in large measure assist the claim agent in his work of education with a view to preventing accidents. The

claim agent, however, finds that his school of education must continue constantly. Spasmodic efforts now and then have their effect, but unless persisted in cannot obtain the necessary result.

In attempting to educate the public the claim agent finds an even greater task. As a result of the work begun by the public service companies, inspiration has been afforded to many thousands of citizens in every commercial pursuit to interest themselves in safety-first work, and their efforts have been valuable in that they have caused the people to think along the lines of accident prevention. Yet those of us engaged in this work know that no matter how often the public is told to be careful many of them will not heed. We can put up signs at crossings and we can tell them to stop and look and listen, but we know that the only sure way to avoid accidents at such places is absolutely to do away with grade crossings. This particular instance will serve as an illustration that must guide us throughout the entirety of our efforts in this class of work.

The successful claim agent to-day is the man who will quickly perceive liability and adjust it when it can be reasonably adjusted before there is the added element of the lawyer and the provocation that comes from the feeling on the part of the claimant of undue delay. When the claim agent is convinced that liability exists the claim should be settled without loss of time or energy. More of us every day are coming to a realization of this fact. With these matters that must be settled out of our way, we have left more time and energy to expend in the defense of those claims which we feel to be without merit.

### PSYCHOLOGY AND CLAIM WORK

Mental states and processes have much to do with successful handling of claim work. They are important not only with reference to the mind of the claim agent himself but with reference also to the minds of his subordinates and other officials of his company. The development of proper mental states and processes with reference to the subordinates comes as the result of training and developing each in his special line according to his fitness and adaptability. The mental attitude of other department heads with reference to claim work is also much affected by the attitude of the claim agent. In recent years there has been a passing out of disconnected efforts by different department heads, each selfishly striving to advance the interests and credits of his own particular department regardless of what may happen to some other department, and a coming in of a spirit of co-operative effort for the all-around development of the interests of the organization. By this means the claim agent has enlisted with him in his services the very best that every organization affords.

The claim agent's task does not end, however, with his associates. He must go further and inculcate in the minds of the members of the community at large certain attitudes of thought that will cause the public to understand the workings of the claim department in a way that will rid it of the prevailing notion that wherever and whenever anyone is injured some one must pay for it. The mind of the public at large should be impressed with the fact that all cannot receive damages, but that those entitled to them will receive reasonable compensation for their loss. In determining what shall be a fair compensation, however, the injured one must co-operate in a businesslike way with the claim agent, submitting to all reasonable investigation and furnishing whatever evidence is necessary to establish the truth of his contention. Care should be taken in the handling of a claim that no false impression is conveyed that will cause expectation of more than a claim is worth, and



then when a settlement is made there will remain a satisfied claimant and a friend.

Such a course of action with reference to legitimate claims will enable the company to pursue with more vigor a policy of absolutely no quarter with frauds and impostors and no compromise with unjust or improper claims. The feelings of the public must be regarded, and the company which gets the reputation of dealing fairly with legitimate claims will find the task easier when compelled to defend itself against improper demands, because the feeling that the company is willing to do all that is fair and right will be reflected in the verdicts of the jurors and in the judgments of the courts. The claim agent who can best induce conditions of this sort is the man who will best serve his company's interests.

## Oral Discussion

BY CECIL G. RICE

Assistant to President Pittsburgh (Pa.) Railways

I have nothing to say against the claim agents of the past. I believe that, under the conditions which they had to face, their work was equally as good as the work of the claim agent of to-day. The years, however, have brought changes and it is my opinion, based upon my experience, that there has been a complete reversal of the methods of handling claims. Formerly, a claim agent dared not go to a person who had been injured, or who was involved in an accident, for fear of suggesting a claim. To-day, however, there is not one out of five people in any large community but knows that there are such things as claims. By reason of the publication of large verdicts, and the almost universal publicity in connection with the workmen's compensation laws, the idea has got into the minds of a great many people that no matter how they are injured, the state makes companies pay them something. Every compensation case that is settled, every case that is settled by the courts, adds one to those made by the claim departments of a member company. So that to-day, instead of being fearful to give to a person information, it is necessary to see him in order to convince him that he has no claim. It was just the opposite in the days of old. Years ago the matter of adjusting claims was a battle of wits. To-day it is a purely business proposition; and when it is not so regarded, something is wrong either higher than the claim man or with him or below him.

## PSYCHOLOGY NOT DIFFICULT

The matter of psychology sounds rather fearful, but it does not mean a great deal. It is merely the science of the mind. The science of psychology is merely the orderly arrangement of relative facts. The thing to keep in mind in considering this subject is that the claim agent does not settle the claim, but does settle with the claimant. John Jones may have a broken leg, and it will cost so much. Tom Brown has exactly the same injury, but it may cost ten times as much or only one-tenth as much. The individuality of the person involved has really more to do with any settlement than does the actual occurrence itself.

Let me illustrate how psychology may be useful in settling claims. Recently, a man who was a cheat claimant acting throughout the country, came into our office. His general practice was to report to the claim agent within two or three hours after the occurrence of the alleged accident. He would say that some attorney had happened along and invited him to call, but that he had refused to have anything to do with attorneys and would rather settle with the company. In ten

or fifteen cases around Milwaukee he had used the name of a particular attorney, and he made the mistake of telling the same story when he came in to us.

We all knew that he had been tried for perjury in Milwaukee. I said to him: "Do you suppose, Mr. So-and-so, that this man who invited you to come to see him was attorney — of Milwaukee?" Immediately he was confused, because the name I used happened to be the name of the lawyer with whom he had worked.

I said: "Did you make the statement that you had never had any accidents before this one, and did you swear to that statement? Now, we don't want to take advantage of you, but in this State it is a felony to swear to something that is not true. We might put you in the penitentiary for that." By that time he was sweating quite a little, and said he spoke German mostly but knew how to count money. So I said to him: "Suppose you go home to the American House, where you stayed last night, and write out the accidents you have been involved in, and bring them to me to-morrow morning." The first train went out at eleven o'clock the next day, and he was there about an hour before train time, but he did not leave with any of our money in his pocket.

As far as the claim was concerned, he was easy to handle. There was no fear of paying him anything at any stage of the game, but I want to make the point of the value of the use of suggestion, which is psychology, rather than the strong arm method, saying, "You are a thief and a crook." The mere suggestion to him that this man, who he said was on the car near him and gave him his name, was the attorney out in Milwaukee, had let him know at once that we knew something about his work in Milwaukee, and he would reasonably suppose that if we knew something about him there we would know something about him somewhere else. The suggestion about the danger of committing crime put fear into his heart, and that was all that was necessary.

## HOW TO OVERCOME PREJUDICE

Just what are claim agents going to do to offset the prejudices that exist against all traction claims departments regardless of how fair and square they may have been? The point is, do the people know that claim agents are fair and square, and how are they going to show this fact? The solution of this by the Pittsburgh Railways is to publish what we term a "Code of Ethics and Policies." It is not a theory. It is merely a collation of facts and a description of principles and policies by which we are attempting to handle all business relating to the adjustments for accidental occurrences in and around Pittsburgh. This was described and favorably commented upon in the *ELECTRIC RAILWAY JOURNAL* of Oct. 7, pages 706 and 712-713.

In conversation with a judge of one of our courts recently, I mentioned this "Code of Ethics and Policies" to him. He brought up the subject of claims himself, and I opened up and told him some few things he had not heard before. He was very much interested, and he asked me to send him a copy. While it is copyrighted, if anyone cares to make use of it and will send me a postcard, I shall be glad to have a copy forwarded to him.

My particular interest in this Claims Association is the development of a higher standard of work and added dignity, in the hope that the ultimate result may be that the claim agent will take his place in the official counsels of his company as a man, as an officer, as some one who has a right to consider, suggest and advise—instead of being thought of as a nuisance because everything seems to be going out and nothing coming in.



# Social Relations of Electric Railways

Comprehensive Progress Report to American Electric Railway Association on Important Problems Arising Out of Co-operative Activities of Management and Employees—Main Subject Covered in Present Report Is Protection of Employees Through Life, Health and Accident Insurance

By JAMES D. MORTIMER, Chairman

HENRY C. BRADLEE

EDWIN W. RICE, Jr.

Composing the Subcommittee on Social Relations of the Committee on Public Relations

THE problems considered under the heading of "Social Relations" naturally group themselves into two parts: (1) The protection of the employee, including the subjects of industrial injury compensation, life insurance, health insurance and old age pensions. (2) The betterment of the status of the individual employee, including such subjects as the best form of wage payments, the minimum wage, education, practices of efficiency, standards of living, thrift and profit-sharing plans with the employer. The committee has not approached the problems of protection or insurance from the standpoint of policy but solely from the standpoint of economic and efficient administration. It has not concerned itself with philosophical aspects or with the desirability or expediency, in individual cases, of providing such insurance.

## AGENCIES FOR SOCIAL INSURANCE

In conceding the need for such forms of social insurance as compensation for industrial accidents, life insurance, health insurance and old age pensions, the question arises as to the agency best suited to provide this protection. Shall it be the state, an organization of employees, the employer, co-operative action of employee and employer, or an underwriting agency such as the insurance company? These agencies may be compared thus:

### 1. State Insurance:

It seems generally conceded that the provisions for sickness, accident, life and old age in Germany have been well administered. The scheme has comprised central government supervision supplemented by local administration by employees' benevolent organizations. The same cannot be said of the English insurance act administration. The German success appears to be due to strong bureaucratic control and racial characteristics of thrift and obedience to authority lacking in more populist forms of government. A number of our states, notably Washington and Ohio, provide for state administered funds to care for industrial accidents, and one state, Wisconsin, provides for life insurance upon the voluntary plan. On the basis of charges which have been made concerning the conduct of business of those states, this form of administration does not seem to have been a conspicuous success. A number of governmental divisions, including our federal government, have provided staff pension plans for public employees.

The failure to make adequate provision for the accruing liabilities under these pension plans has been the universal shortcoming of such administration.

Lack of a broad and far-sighted financial policy and the usual inefficiency under political management are recognized shortcomings which will probably postpone the day when state insurance will become the ultimate method in the solution of the problem of social insurance.

The obvious advantage of administration by state agency is its widespread effectiveness. Under such a plan the individual would be free to change his employment or affiliation without being deprived of like protection in some other pursuit. The very comprehensive character of any plan of state insurance, however, comprising as it would every diversified vocation and trade, constitutes its greatest weakness from the standpoint of efficient administration. If such a plan were supported by contributions from various industries it would be a long task, if not a hopeless one, to determine equitable premium rates to be charged for each occupation and each industry.

### 2. Employees' Organizations:

There have been no comprehensive plans of social insurance, health, accident, life and pension,

inaugurated by trade unions. In fact, insurance benefits have not been considered germane to trade union activities. Where such benefits are provided the funds for such purpose have not been organized.

According to statistics given in the *Quarterly Journal of Economics* (May, 1916), out of 154,684 persons engaged in electric and street railway occupations, only 33,773 or 21.8 per cent were members of trade unions in 1910. These figures evidently include only platform labor, as the total number of persons employed in 1912, according to the 1912 census report on street and electric railways, exclusive of six companies which failed to make report, was 282,461. The Amalgamated Association of Street & Electric Railway Employees of America instituted a system of death and permanent disability in 1895. Death benefits of from \$100 to \$800 are paid, dependent upon the length of term members have been in good standing. Disability benefits are limited to total disability "through sudden accident while in service." Old age benefits accrue only "after twenty years of continuous membership and reaching the age of sixty-five." During the six months' period ended June 30, 1916, the association reports having

There is perhaps no single industry in the country which has accomplished more in the betterment of social relations than the electric railway industry. Yet, although reports have been many in regard to other phases of its work, not much information regarding the progress made in solving problems between companies and their employees has heretofore been available in printed form. For this reason the report of the subcommittee on social relations of the public relations committee of the American Electric Railway Association, presented at the Atlantic City convention on Oct. 11, is a record work. The accompanying abstract gives in detail the survey of the industry contained in the report, but, owing to limitations of space, only the general points of the elaborately prepared chapters on life, health and accident insurance are here presented.



expended \$144,789 for 320 death benefit claims and \$2,200 upon three disability claims. No old age benefits were paid. The benefits are supported by an assessment of 25 cents per member per month. There are no liability funds established for accruing obligations due to increased age and period of membership. At the fourteenth convention a report of the general executive board—reading "Disbursements (from the benefit fund) were 79 per cent of receipts the previous year and 84 per cent this term. This is not an alarming increase, but should serve as a caution against adding to the present liability"—was concurred in with the recommendation that no further burdens be added to the benefit fund.

In addition the association reports that thirty-three of its locals pay death benefits in one form or another. These range from definite payments of \$50 to \$200 per member to the amount available from per capita assessments or the proceeds of "passing the hat." While the benefits of the parent association do not include sick benefits or accident disability benefits, eighty-nine divisions pay limited benefits reported to range from \$2 to \$9 per week usually for a period of thirteen weeks. That these benefits are much restricted is evident from the fact that for the eighty-nine divisions these benefits during 1915 aggregated \$55,725 or \$626 per local.

Whatever advantages there may exist in theory to the employees' organizations as administrators of the protection provided by the various forms of social insurance, the fact remains that these have not developed in practice. The benefit liabilities assumed have not been handled in a business-like manner. The effectiveness of the organization is limited to the trade in which it operates rather than the entire industry.

### 3. Employers:

Few electric railway companies exclusively administer and support benefit funds, aside from pension systems. Twenty-six electric railway companies reporting pension systems sustain these funds. Only three out of ninety-four companies reporting sickness and accident relief funds report exclusive administration of these by the employing company. Nine out of fourteen companies operating under the "group insurance plan" pay full premium for the amount of such policies. The objection to this form of administration lies in the lack of interest and consequent lack of economic administration which exists where the employee does not co-operate in the maintenance and distribution of such funds.

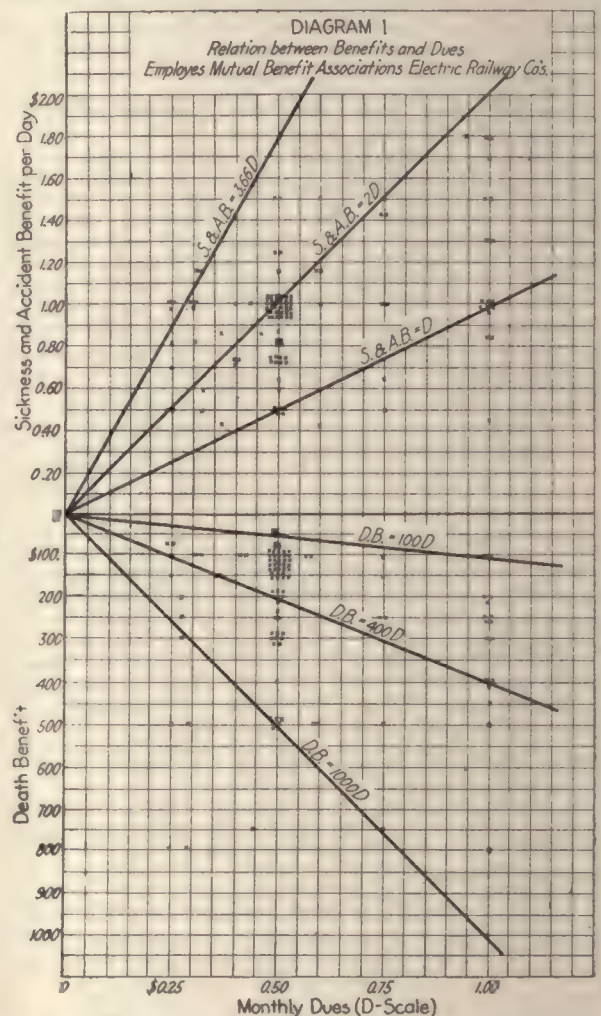
### 4. Co-operative Associations:

One hundred and eighteen electric railway companies report benefit associations maintained in co-operation with employees and providing sickness and accident disability benefits, medical supervision and death benefits. Although membership in these associations is voluntary, the percentage of total employees cared for is substantial. Out of thirty-nine associations which reported the number of employees and the number of members in the relief associations, fourteen have a percentage of membership between 85 per cent and 100 per cent, fourteen a percentage of membership between 65 per cent and 85 per cent, and only eleven a percentage of membership under 65 per cent.

Twenty-five associations reported whether or not medical examination is required for admission to membership, and only one does not require such medical examination. Twenty-three associations reported limitations of age below which the association will not admit members; five of these will not admit to membership employees under sixteen years, six will not admit employees under eighteen years, six will not admit employees under twenty-one years, and two make no such

limitation. As regards the upper age limit of twenty-three associations reporting, thirteen will not admit to membership employees over forty-five years of age, four will not admit employees over fifty and the age limits of the remainder vary from thirty-five to sixty-five years. Of the forty-three associations reporting on the length of service necessary before admitting to membership, twenty-four, or 65 per cent, make no such requirement; nine, or 21 per cent, require a probation period of three months; six require a probation period of thirty days, and the rest range from sixty days to three years.

The majority of associations are administered by boards of trustees or directors consisting of a number of employees elected by members and a number elected by the company, although in some few instances the administration rests entirely with the employees. Of ninety-four companies reporting as to the sources of financial support of the association, the great majority report contributions from the employing company in excess of 50 per cent of the entire cost of conducting



SOCIAL RELATIONS—FIG. 1—RELATION BETWEEN BENEFITS AND DUES IN ELECTRIC RAILWAY EMPLOYEES' MUTUAL BENEFIT ASSOCIATIONS

the association. In almost all instances the administrative overhead expenses, including cost of keeping records, medical inspection, etc., are carried by the employing company. Of 107 companies reporting membership dues, 60 per cent require monthly dues of 50 cents, 10 per cent require monthly dues of \$1, and the remainder, dues ranging from 25 cents to \$4. Of forty-seven companies reporting initiation fees, 67 per cent require a fee amounting to \$1, 15 per cent a fee of 50 cents, and the remainder, fees ranging from 25 cents to \$2.



For such membership fees and company contributions eighteen associations report maintaining a medical staff and five report maintaining hospitals and infirmaries in addition to benefits. The disability benefits range from \$5 to \$12 per week, although one association reports, under its additional insurance plans, benefits for members at cost of as high as \$120 per month. Out of sixty companies reporting disability benefits, 35 per cent of the cases limit the payment of the benefit to thirteen weeks in one single case and 22 per cent limit the payments to 100 days.

Death benefits vary over a considerable range among the different associations from \$50 to \$1,000. Out of sixty-eight associations, fourteen report paying death benefits upon the death of the wife and eight upon the death of the child of the employee. The usual benefit paid by these associations upon the death of the wife is \$50 and upon the death of the child \$25. A number of associations also bear part of the funeral expenses.

The relations between benefits and employees' dues is shown in Fig. 1 on page 880. For the majority of associations a sickness and accident benefit of \$7 per week and death benefit of \$100 is provided for monthly dues of 50 cents and the employing company's additional contribution. That the benefits as compared with the dues vary over a wide range is apparent from the figure.

The reports indicate that in most instances the benevolent associations are working well. In addition to medical supervision and free medical care in cases of sickness by the association physician, visiting committees appointed by the members supplement such care and comfort in case of disability, and no doubt exercise a deterring influence upon malingering. A number of associations are now increasing their benefits. In one instance as high as 80 per cent of the weekly wages is paid in the case of sickness and accident disability, \$2,000 in the case of death from natural causes and \$5,000 in the case of death from accident.

#### 5. Underwriting Agencies:

At the present time there is no single insurance company which is attempting to write a policy covering life, accident, sickness and old age pensions or annuities in a form sufficiently attractive to be considered as an acceptable agency for the carrying out of insurance plans. The forms of life policies are not attractive for employees with moderate incomes except for nominal amounts. Some few companies write so-called industrial insurance at 5 and 10 cents a week, but these are unusually heavily burdened with collection overhead expenses. The only form of insurance adapted to social insurance plans is the group insurance policies recently offered for employees of a single industry. These are confined to the payment of only life insurance benefits.

A number of the old-line life insurance companies originally writing sickness insurance, have abandoned the business. Disability for sickness and accident are now underwritten almost exclusively by the casualty companies and at rates not designed to be attractive to any but select risks. Few companies are pushing the sale of annuities, and none of these has made any effort to underwrite pension plans or annuities deferred until the usual age of retirement. The State of Massachusetts has, since 1907, permitted savings banks to issue policies for life insurance and annuities limited respectively to \$500 and \$200. These consist of straight-life policies with premiums to cease at the age of seventy-five, endowment policies maturing in twenty years and at the age of sixty-five, and insurance endowment policies under which insurance continues to the

age of sixty-five, at which time premiums cease and the payment of the annuity begins.

The reason for this lack of development does not lie in the sparse demand for such forms of underwriting, but in the unlimited field for regular policies and the unattractiveness of policies carrying small reserves and possibly increasing risks due to inadequate supervision.

#### 6. Relative Advantages:

Of the various types of administration enumerated, co-operative association of employee and employer is best suited to the future development of a comprehensive plan of social insurance. It is the most readily available means. It comprises the entire industry rather than the separate trades. It is assured of economical management and close supervision. Should state administration ever occur, it may, in all likelihood, take the form of supplementing rather than superseding existing agencies. In trade unionism, the social insurance is and will continue to be a matter of secondary importance. Present tendencies do not suggest the marketing of underwriting suitable in scope and form for the electric industry.

#### INSURABILITY OF ELECTRIC RAILWAY EMPLOYEES

It is well to make a general survey of the characteristics of the electric railway business affecting the insurability of employees, which must be kept in mind in providing permanent plans of insurance. These characteristics may be commented upon under suitable headings:

##### 1. General Characteristics:

There are few industries which require in their scheme of organization so many diversified kinds of employment as the electric railway. In addition to motormen and conductors operating in outdoor environment, the list of employees includes power plant operators, firemen, engineers, electricians, linemen, troublemen, all employees with widely different duties, but necessary solely to provide the motive force which propels the electric car. The maintenance of roadway, track, and buildings and structures requires another group of employees embracing every type of employment from surveyor to painter. The maintenance of rolling stock also requires every type of employment from founder and machinist to car cleaner. In one typical company the occupations represented in the electric railway business number 124. Of these the largest group naturally is the trainmen intrusted with the operation of cars. Employees connected with maintenance and furnishing of power, however, constitute more than 50 per cent of the number of employees.

Electric railway employees vary in degree of skill from the common day laborer to the highest skilled electrical, civil and mechanical engineers. Many of the employees in specialized occupations require years of preparation. Such employees have chosen their life vocation. If they were to leave one electric railway, it would be only to pursue their calling in some other electric railway or allied industry. On the other hand, those engaged in other occupations, among them trainmen, are constantly changing. Trainmen are usually recruited from the untrained additions to the city's industrial population from the country. The vocation requires intelligence and skill, but it is easy to learn. The compensation usually exceeds that of other trades requiring a like degree of education and skill. The work is congenial and out-of-doors. The average hours of employment are not excessive, nor is the calling hazardous. Such work is likely to attract young men of more than ordinary intelligence and ambition, and



serves as a stepping-stone to the more skilled industries. There are naturally variations in the length of employment and in the compensation paid therefor, because of these differences.

Finally, the complexity of the industry requires employment under the most extreme variations of hazard, ranging from office employees and others usually classed in the "select group," to employments classed as "extra hazardous" and "non-insurable" in the standard accident insurance classification of casualty companies. This latter class includes operators of electrical machinery, linemen, structural steel workers, wiremen, and operators of special machines.

## 2. Classification by Age:

A factor of great importance in life and sickness insurance and pension plan cost computations and of some importance in accident insurance computations is the age of the insured group. The figures given in Table I are derived from analysis of the records of a single company. The change in average age in this case has been due to higher standards of labor and the operation of social insurance plans.

## 3. Classification by Years in Service:

This is a factor of importance in determining the cost of a pension plan where, as is usual, the amount of pension liability is dependent upon the years of service prior to retirement. The data given in Table II cover the same company and periods for which classification of employees by age is made in Table I.

## 4. Recession Rate:

Factors of importance in determining the cost of life insurance and pension plans are the resignations and dismissals. The usual insurance computations assume that with the exception of those removed from participation by death, all surviving members will be entitled to death benefits or pension annuities. Needless to say, this factor is of varying importance in different companies. Tables III to V, giving data for a single company, indicate the tendency of the recession rate by age and years of service and occupation:

## 5. Classification of Compensation:

A factor of importance in all insurance is the extent of the possible burden for premiums as compared with the compensation paid. The question is, in short: "How much insurance can the average employee afford to carry?" The federal census throws some light on the average wages paid electric railway employees, variously classified in its reports. Table VI shows the average wage during 1907 and 1912 for each group and the proportion represented in each. The average wage of \$711 for the entire country is somewhat less than that obtaining in the larger companies.

The distribution of average wage by ages and years of service is also of importance. Such an analysis has been made for years past by one of the member companies, and the results, for a typical year, are given in Fig. 2 and Fig. 3 on page 883. These illustrate a maximum earning capacity at about forty years of age and fifteen years of service.

## 6. Conditions for Improvements of Risk:

The success of any plan of insurance is dependent upon the elimination or reduction of risks. The cost of life and sickness insurance depends upon careful initial selection and periodic supervision of health and mode of living. Accident liability depends principally upon education and safety-first measures; age and health are important. The extent of preventive efforts in each of these fields has a marked effect upon cost.

TABLE I—DISTRIBUTION OF EMPLOYEES BY AGE IN PER CENT OF TOTAL

Age Group	1912	1913	1914	1915
16-19 years	7.9	6.3	4.3	2.2
20-24 years	22.7	23.8	20.0	17.8
25-29 years	21.3	22.4	24.5	22.9
30-34 years	14.7	15.2	17.2	18.4
35-39 years	10.9	11.2	13.3	13.6
40-44 years	9.0	9.0	8.7	9.4
45-49 years	6.4	5.4	5.5	6.1
50-54 years	3.9	3.4	3.3	4.5
55-59 years	2.1	2.2	2.2	3.4
60 years and over	1.1	1.1	1.0	1.7
Average age	31.6	31.4	32.0	33.1

TABLE II—DISTRIBUTION OF EMPLOYEES BY YEARS OF SERVICE IN PER CENT OF TOTAL

Years in service group	1912	1913	1914	1915
Less than 1 year	42.2	37.3	21.5	17.3
1 year	11.1	20.6	13.6	6.2
2 years	9.6	7.1	16.3	13.9
3 years	4.7	6.4	10.9	13.9
4-5 years	6.7	5.2	10.4	16.3
6-10 years	13.0	11.3	12.9	14.9
11-15 years	7.2	6.9	7.5	9.1
16-20 years	4.5	4.1	5.2	4.7
Over 20 years	1.0	1.1	1.2	3.7
Average years of service	4.12	3.98	4.97	5.97

TABLE III—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY AGE

Age Group	Ratio Withdrawals During Year to Number of Employees at End of Year	Ratio Withdrawals During Year to Number Employed During Year
15-19 years	86.6 per cent	46.4 per cent
20-24 years	56.4 per cent	36.1 per cent
25-29 years	39.4 per cent	28.3 per cent
30-34 years	26.5 per cent	20.9 per cent
35-39 years	23.9 per cent	19.3 per cent
40-44 years	24.7 per cent	19.8 per cent
45-49 years	17.9 per cent	15.2 per cent
50-54 years	20.1 per cent	16.3 per cent
55-59 years	9.7 per cent	8.9 per cent
60 years and over	30.3 per cent	23.3 per cent
Total	36.7 per cent	26.9 per cent

TABLE IV—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY YEARS OF SERVICE

Years of Service	Ratio Withdrawals During Year to Number of Employees at End of Year	Ratio Withdrawals During Year to Number Employed During Year
Less than 1 year	95.4 per cent	48.8 per cent
One year	63.4 per cent	38.8 per cent
2 years	23.1 per cent	18.7 per cent
3 years	11.8 per cent	10.6 per cent
4-5 years	8.8 per cent	8.1 per cent
6-10 years	6.6 per cent	6.2 per cent
11-15 years	4.5 per cent	4.3 per cent
16-20 years	4.1 per cent	3.9 per cent
Over 20 years	5.3 per cent	5.0 per cent
Total	36.7 per cent	26.9 per cent

TABLE V—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY REPRESENTATIVE OCCUPATIONS

	Ratio Withdrawals During Year to Number of Employees at End of Year
Accounting clerks	19.2 per cent
Record clerks	68.4 per cent
Track repairmen	117.0 per cent
Yardmen	95.0 per cent
Trainmen	23.6 per cent
Car house repair crew	30.6 per cent
Car cleaners	132.0 per cent
Carpenters and helpers	116.0 per cent
Painters and helpers	77.8 per cent
Blacksmiths and helpers	25.0 per cent
Machinists and helpers	79.3 per cent
Firemen	88.2 per cent
Oilers	44.5 per cent
Coal passers	150.0 per cent
Boiler washers	38.4 per cent
Pumpmen	50.0 per cent
Switchboard operators	35.0 per cent
Wiremen	60.5 per cent
Polemen	202.0 per cent
Groundmen	105.0 per cent
Electrical repairmen	54.2 per cent
Steamfitters and helpers	36.4 per cent

TABLE VI—ANNUAL COMPENSATION OF ELECTRIC RAILWAY EMPLOYEES (From Census Report)

	1912	1907
	Per Cent of Total Number	Per Cent of Total Number
	Average Wage	Average Wage
Salaried officers of corporations	2.8	2.5
Managers and superintendents	2.7	2.4
Clerks, stenographers and other salaried employees	7.5	3.6
Conductors	23.4	25.3
Motormen	24.1	24.8
All other employees	39.5	41.4
Total	100.0	100.0
	\$711.22	\$681.89

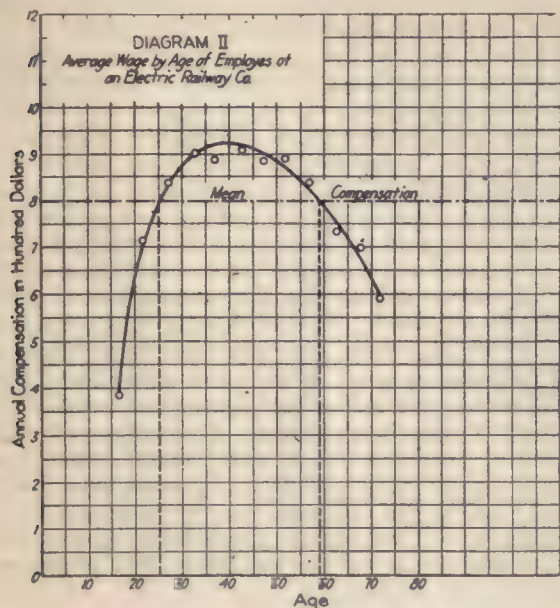


Fig. 4 and Fig. 5 show the reduction in accidents per employee with increased years in the service. These figures refer to the experience of one company only, in connection with employees in the power plant and transportation departments respectively. This reduction in

of the industry will, of course, vary in importance with the conditions found in each particular locality and company. They are essentials, however, of the successful administration of social insurance.

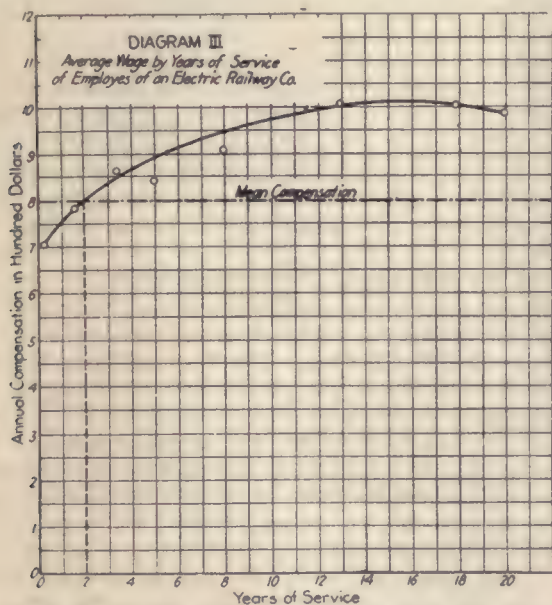
#### LIFE INSURANCE

According to the sub-committee, the necessity of life insurance in some form or other is well recognized by all students of sociology. Its influence in reducing poverty in old age and charitable and poor home relief is quite generally appreciated. Life insurance in some form will sooner or later become universal. If the determination of the method is left to the sociologists, it will likely take the form of compulsory insurance, in whole or in part, supported by taxation, as in the case of many European countries. American industry will soon have to decide whether it wishes to be forced into



SOCIAL RELATIONS—FIG. 2—AVERAGE WAGE BY AGE OF EMPLOYEES ON ONE ELECTRIC RAILWAY

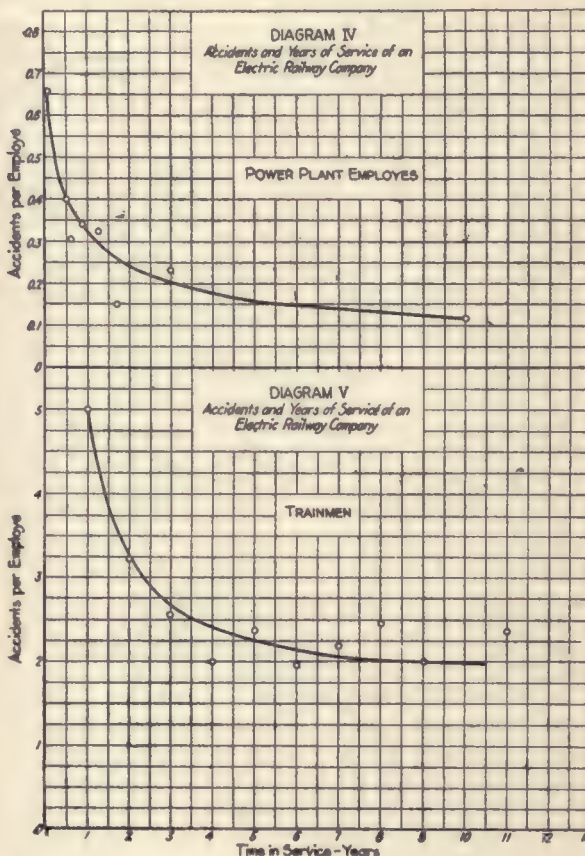
accident hazard is due presumably to a number of causes. The company which reports the figures has had a safety campaign under way for several years, and the older men naturally give the matter more attention than the younger men. The men longest in service usually do work in which there is less liability to minor injury, although, insofar as major accidents are concerned, this does not appear to hold. A number of other causes are doubtless operative, but the conclusion is cer-



SOCIAL RELATIONS—FIG. 3—AVERAGE WAGE BY YEARS OF SERVICE OF EMPLOYEES ON ONE ELECTRIC RAILWAY

tainly warranted that if the hazard decreases with experience, education will accelerate the process and that some form of safety-first measures is a condition of a successful system of accident insurance.

The factors outlined in the above preliminary survey



SOCIAL RELATIONS—FIGS. 4 AND 5—ACCIDENTS AND YEARS OF SERVICE FOR POWER PLANT EMPLOYEES AND TRAINMEN ON ONE ELECTRIC RAILWAY

this kind of life insurance, or whether it wishes to anticipate such legislation by voluntarily providing life insurance for its workingmen and other wage earners, or utilizing existing machinery for placing life insurance at their disposal in a way to cause it to be used.

A large number of electric railways of the United States provide some life insurance for their employees either through the medium of benefit associations or through life insurance companies. Out of ninety-five companies reported as having benefit associations and providing death benefits, twenty-three pay death benefits of \$100. The benefits vary from \$50 to \$1,000. Fourteen associations report paying death benefits upon the death of the wife, and eight upon the death of the children of the employee. One association writes endowment as well as life policies for as high as \$2,000. The cost of such benefits, including insurance against sickness and accident as well as death, is borne in the



majority of instances jointly by the employee and the company. A medical examination is usually required by these associations prior to admission to membership. Out of fourteen companies reported as insuring their employees in insurance companies, the greater number provide insurance of \$1,000. In a number of these companies the insurance provided is equal to the yearly wages of the deceased employee. In a majority of these instances the cost is shared by the company and the employee, although a number of companies foot the entire bill. Such insurance usually requires no medical examination. The protection thus provided electric railway employees is supplemented in many cases by industrial insurance, assessment society benefits and regular old line insurance policies.

### 1. Cost Factors:

The most important factor in the cost of insurance is the chance of death at various ages. Under the American experience table, at the age of thirty a contribution of \$8.43 by all the 85,441 living at that age would pay a death benefit of \$1,000 for each of the 720 deaths during that year. At the age of sixty the necessary contribution would be \$26.69, due to the higher death rate, while at the age of twenty the necessary contribution would amount to only \$7.80. These amounts are, for these varying ages, the net cost per premium of an insurance of \$1,000. The very substantial increase in the net cost with increased age demonstrates clearly the fallacy of uniform contribution to life insurance funds irrespective of age. Where the life insurance benefits are small, as is now the case with the large number of electric railway benefit associations, the ill effects of uniform contributions are not so apparent, but it is certain that if an increase in death benefits is contemplated, the scheme of monthly dues of associations must be made to conform with the ages of members or the contributions changed yearly if the fund is to continue to remain solvent.

### 2. Determination of Self or Purchased Insurance:

There is, of course, at the outset considerable force to the argument that an industrial concern cannot afford to go into a business which is foreign to its particular field, concerning which it knows little and which it is not equipped to handle. The argument is not, however, strictly applicable to the electric railway business. Many street railways are carrying their own public medical and claim departments, which are capable of taking on a small additional amount of business in making examinations and investigating claims, with little added cost. The problem of investment of reserves presents no difficulties as electric railway securities and real estate mortgages, legal investments for insurance funds, are familiar investments. These are important advantages. At least, as is the case with other supplies and services which the electric railway company buys or produces, the possibility of self-insurance offers a competitive advantage which should permit it to negotiate for insurance with the underwriting agency, if it chooses to do so, at the most economical figure.

The advantages and disadvantages of self-insurance may be summarized as follows:

(a) Unless the group is sufficiently large the mortality experience will only apply in part, so that net premium or annual cost may exceed that of an underwriting agency. Actuaries consider a group of 500 sufficient to come within the usual mortality experience. There is nothing to indicate that electric railway employees are subnormal or extra hazardous risks. Should this occur, insurance rates would be expected to conform to the added risk. Where the group is sufficiently large,

the company or association representing it would, by carrying its own insurance, immediately secure the benefit of selection arising out of the more careful preservation of the health and safety of its employees.

(b) Reserves can be more profitably invested than the reserves of insurance companies, and where necessary the company can guarantee the earning.

(c) More liberal terms and conditions as to the cash and surrender values can be given the employee under the self-insurance plan.

(d) By making insurance compulsory, the cost of solicitation can be reduced to a minimum, and a large part of the overhead cost eliminated.

There is a final consideration which must not be overlooked, namely, that of increasing the *esprit de corps* of the employee organization. The benefits of mutual co-operation are only appreciated where such activities are self-administered. The solicitation committees and visiting committees are important factors in increasing the educational value of co-operative activities. A live association which provides the benefits as well as conducts the funeral is of greater importance to the employee than a mere nominal organization which turns the work over to some impersonal underwriting agency. This last advantage is intangible, it is true. Its importance will be more readily appreciated by those who have had experience in the promotion and administration of benefit associations.

### 3. Group Insurance:

Insurance written upon the lives of a large number of employees of an industry, on one contract, has come to be known as group insurance. This plan is based upon the one year term, and where the group is sufficiently large, the risk is accepted without medical examination. There is, of course, a selective influence due to the fact that the members insured are regularly employed, and hence not likely to be impaired lives.

Replies from fourteen companies that have contracted for group insurance for their employees indicate that 12,190 employees are so insured, the average age being about thirty-six years, and the average premium \$11.10 per \$1,000 of insurance. Four companies provide \$500 benefits; seven companies, \$1,000 benefits. Two companies provide insurance equal to a year's salary, and two companies vary the benefit with the length of service. Eight companies contribute all the premium; two contribute \$4 per policy; one contributes \$1 per \$1,000 policy; one the full premium on a \$1,000 policy, while in two companies the entire cost is borne by the employees.

Owing to the newness of the group insurance form of contract, many features might, in the sub-committee's opinion, be suggested which have not as yet been incorporated in the policies. The cost on the one year term plan is certain to increase with the increase in the average age of employees. This is likely to be a serious objection, as the entire tendency of employment in the street railway industry, with the operation of pension systems and other co-operative activities, is certain to be more permanent. Nothing has as yet been done to give preferred rates where the conditions of medical attention are such as to entitle the insuring company to such a reduction. The term plan, moreover, does not permit of automatic provision for a continuation of insurance should the employee leave the service of the company. Because both protection and employment are terminated simultaneously, the one year term system is not likely to be enthusiastically endorsed by the employee. These objections would be obviated by an ordinary life rather than one year term system of insurance.



#### 4. *Form of Insurance Desirable:*

The general specification of the type of insurance protection, which it seems should be furnished either through employees' associations or some underwriting agency, is as follows: (a) Protection should be offered to all employees and participation for a minimum amount made compulsory during employment. Individual contracts with individual employees should be provided. (b) A sufficient number of kinds of protection should be provided to suit the variety of conditions of income, age, dependency, etc., which will be found among the various employees. The term insurance plan with its increasing cost is not desirable. One form of policy should be provided on the ordinary life plan, providing for level premiums as long as a protection is afforded. A second form of policy should be provided which will permit the payment of full protection in twenty installments. A third form of policy which has much to commend it, is a limited term endowment policy. (c) The policy should make liberal provisions for automatic extension where through sickness or misfortune premiums are not paid and should provide for the payment of the face of the policy where the total disability makes it impossible to continue employment. (d) The policy should automatically give the employee the right to continue the insurance should he leave the employment of the company; accept the cash surrender value reserved to his credit, or apply such reserves without further payment to the purchase of paid up or extended insurance. (e) With the accumulation of reserves, liberal provisions can be included in the policy for the extension of protection, even where for some reason premiums are not paid. The policy should contain the usual provision for grace in payment and reinstatement. (f) A change in beneficiary should be provided at the option of the insured, at any time during the continuation of the policy, but the matter of assignment of policy should be carefully safeguarded, provision being made in the interest of the employee that the association assumes no liability as to the validity of any assignment and that satisfactory proof of the assignee's interest must be produced on making claim. (g) Payment of premium should preferably be provided in monthly installments and the employee's share collected by payroll deductions or deducted from the dividends of profit-sharing plans. (h) It is the usual experience that single payment life benefits are dissipated in a short time by unwise investments and extravagances. Many policies now provide for the payment of an income to the beneficiary for a specified period of time desired by the insured. The so-called Gilder weekly income policy plan, designed for moderate sums, features an immediate payment of \$75, at death, to defray funeral expenses, and the payment of \$10 per week for fifty-two weeks to the beneficiary. This benefit is the equivalent of an insurance of \$587 if paid in one sum. A policy of \$1,000 would provide a monthly income of \$40 for two years in addition to a funeral benefit. These are a desirable form of payment. Larger policies should permit of the payment of an annuity for the life of the beneficiary.

#### 5. *Administrative Problems:*

Various administrative problems present themselves in placing in operation some plan of insurance as outlined, but the subsequent operation of the plan is more or less automatic. Insurance accounting does not require a separate account for each policy, the costs, reserves, paid up insurance and extended insurance values being readily determined at any time from the tables, and a copy of the table covering the history of the policy being contained in each individual contract. A check up or valuation of reserves is necessary each year. The

annual reports usually required present no unusual difficulties for the accounting departments of electric railways. Many companies now require a more exacting medical examination upon employment than is required by insurance companies. If, as is now the case in the administration of many of the benefit associations, the employing company supplies office space and contributes supervisory and accounting work, the complication of loading can be directly obviated.

If the surrender values are made equal to the reserve, there will be no accruing surplus other than that arising out of more favorable mortality. It is not necessary, therefore, to complicate the policies by making them participate and providing payment of dividends. Savings from a better selection of mortality will serve to enhance the reserve and create a surplus. When these surplus reserves reach a substantial point, the premium rates may be reduced. The rates, reserves, surrender values, paid-up insurance and extended insurance options may be definitely stated in the policy and no question or dissatisfaction can arise as to the participation of the employee, should he leave the service of the company.

#### 6. *Social Problems:*

The regular routine work of examination, selection of premiums, payment of death benefits and surrender values must, of course, be supplemented by the work of employee members of the association in benefit promotion, visiting and funeral committees. The largest social service to be rendered lies in the education of the employee as to his duties toward those dependent upon him and the business-like way of meeting such responsibilities.

The extent of the protection which is necessarily provided if any plan of life insurance is to be effective, will depend upon the living necessities of the employee's wife and his children until they attain the age of self-support. The protection should be at least \$1,000, permitting an income of \$40 per month for two years and funeral expenses. Adequate protection requires an insurance of at least \$5,000 if a small annuity is to be provided during the remaining life of the wife. The premiums for this latter benefit fall well within 10 per cent of the annual income of any regular electric railway employee.

#### HEALTH INSURANCE

Because of their immediate and recurring nature, health benefits are probably the most popular form of insurance. For this reason also they are the least available form of insurance on the market and the most desirable form from the employing company's own standpoint.

Of the one hundred and eighteen companies having employees' mutual benefit associations, ninety-nine give data on sickness and accident benefits; 48.5 per cent of these provide a benefit of \$1 a day during sickness, and 12 per cent from 50 cents to \$1 a day, dependent upon the dues paid. In a large majority of cases this disability benefit together with the death benefit is supported by dues of \$1 per month, half of which sum is contributed by the employee. Sickness and accident disability insurance plans usually provide that a certain stipulated duration of disability elapse before the member becomes entitled to the benefit. This is required to safeguard the association against claims for imaginary sickness or trifling indispositions. Thirty-nine associations report a length of time ranging from four days to twelve days, 27 or 69 per cent of these fixing the duration at seven days.

It is usual also to limit the period during which benefits will be paid for a single continued disability. This



period is usually sufficient to cover the period of sickness, including convalescence, but excludes permanent disability. From information reported by sixty associations, it is noted that in twenty-one or 35 per cent of the associations the benefits are limited to ninety days. In thirteen or 22 per cent of the associations the limit is placed at one hundred days. The associations usually maintain a medical staff entrusted with the care of disability cases. A number of associations furnish medical supplies and surgical treatment free of charge. One association reports giving free medical and surgical aid to the families of employees. A few associations have reduced rates for family service.

The plan of insurance best suited to mutual benefit associations appears to be the renewable term plan with increase in rates at ten year intervals, full benefits limited to three months or one hundred days, half benefits for an additional three months for a single case; no benefits paid for disability of less than one week and no benefits paid for disabilities covered by workmen's industrial injury compensation acts. Under this plan rates based on Manchester unity experience place the cost of disability at about \$3.60 per annum for a \$1 a day benefit at the age of thirty and somewhat exceed the present costs of some mutual benefit associations. To this rate there must be added the component of medical attention, hospital care, sickness supplies, etc.

There are two selective factors which can serve materially to increase or reduce the disability cost. The first of these is medical attention. Prompt investigation is necessary in all cases of illness. Supplementing this a health propaganda as intensive as a safety program is well worth while. One of the member companies publishes monthly a series of health talks written in non-technical manner for employees. Herein lies the largest field of activity for preventive medicine. The second factor is the moral hazard. It is believed that its influence in employees' mutual benefit associations has been exaggerated. Fellow employees, the doctor and the visiting committee of the association are strong inhibiting forces to any tendency to "play hooky" on sick leave.

There is no question but that the employees' mutual benefit association has a field to itself in the most efficient and economical development of health insurance. In so doing it is performing a much needed social service which other industries can do well to emulate. There is a widespread need for cheap insurance. Underwriting agencies are not keen for sickness insurance business. Largely because of these conditions there is an active propaganda for health insurance in the United States modeled upon the German and English systems. Such legislation has been recommended by the Industrial Relations Commission and embodied in the platforms of the old Progressive party. At present the American Association for Labor Legislation is sponsor for a health insurance bill which, it is said, will be introduced in twenty-five states of the Union. It is desirable that American employers examine these proposals and their European counterparts with some care.

The benefits of health insurance can only be made widespread by making the insurance compulsory. Compulsory insurance can be best introduced by the employer making a substantial contribution toward the cost of insurance, considering such contribution as a part of the wage payment and an element in the cost of production. Whatever system of compulsory health insurance is provided in this country will, following the historical development in European countries, recognize the employees' mutual benefit association. It may regulate and prescribe its activities so as to make it less effective. Herein lies the greatest danger of pres-

ent tendencies. The interest of the electric railway industry lies in the maximum benefits for its employees. It should not be burdened with caring for the load of other industries or governmental overhead costs. It can most effectively preserve its identity by leading the way and so efficiently performing its social function that state interference cannot hamper it.

#### WORKMEN'S INDUSTRIAL INJURY COMPENSATION

Every good workmen's compensation act gives and should give expression to these four fundamental objects, viz.: (a) To promote the prevention of work accidents; (b) To provide for adequate medical and surgical care for injured employees in order to forestall or at least to reduce resultant disability for work. (c) To establish definite compensation schedules which will assure to injured employees certain financial relief in proportion to their industrial impairment and which will limit the employer's liability as a practical insurance proposition; and (d) To create a simple but authoritative mechanism of administration to avoid costly and time-absorbing litigation and in its place introduce a large measure of the personal element in the settlement of disputes arising out of personal injuries.

The employer can be materially stimulated to practise effective accident prevention by requiring him under the law to report to the supervising state authority every accident in employment causing injury. The employer's attention is thus focussed upon every accident in his plant, which is the first important step toward arousing him to measures of prevention. The majority of all accidents, however, have their chief source in carelessness, and this in turn points to persistent and consistent efforts to make employees reasonably careful by conscious effort at first and eventually by habit, as the most effective method of accident prevention.

If the claim is justified that the enactment of a workmen's compensation law is for the best interests of employees, it stands to reason that the protection of this law should extend to all employees regardless of their specific occupation, unless their employment is only of such casual nature as to make it impracticable or even impossible to set the compensation machinery in motion before the casual employment ceases.

There is no justification for an insurance monopoly under the law. Every legitimate and properly safeguarded method should be allowed to enter the field of compensation liability insurance, and that form of insurance should be most encouraged which in itself carries the greatest incentive for accident prevention. Stock insurance companies have recognized the importance of this feature by providing differentials in the premium rates of employers, according to the condition of safety of their premises; quite often also they stimulate safety in employment among their clients by advising and assisting the latter in regard thereto. Mutual insurance companies, in which employers in similar industries form a group and each pays in addition to the proportionate cost of administration a proportionate share of the total compensation liability of the group, make it decidedly more interesting and important for the employer to reduce accidental injuries in his own plant and to work toward their elimination in the plants of all group members. Yet even under this arrangement the employer must still contribute his proportionate share of the cost of management and participate financially in the creation of a general reserve fund. To eliminate also this economic waste and to give greatest expression to efforts for accident prevention, employers should be permitted to carry their own insurance under such safeguards as the state au-



thorities may deem necessary for the benefit of injured employees. Since the claim has been advanced that state insurance is the best form of social insurance, it should be made one of the elective forms of insurance in order to experiment with this new and practically untried phase of governmental activity. To most thoughtful people state insurance commends itself least as an effective agency for preventing accidents, ferreting out fraudulent compensation claims, or for economical administration. Whichever form of insurance, however, the employer selects as a condition *siné qua non* for his acceptance of the workmen's compensation law, such action on his part should at once relieve him of all other liability for damages for personal injuries to his employees, and conversely, compensation claims should constitute the only remedy of an injured employee against his employer, if both operate under the compensation law.

It stands to reason that the compensation schedule should be predicated on a part of the wages. All early compensation laws provided that the compensation due an injured employee should be equal to 50 per cent of his average wage during the time for which compensation is payable. Compensation laws more recently enacted, however have adopted a more liberal schedule by recognizing 55 per cent to 66 2/3 per cent of average wages as a basis of compensation, and some of the older laws have undergone amendments to the same effect. The resistance of employers to such liberalizing of the compensation schedule does not merely arise out of the justified desire to keep the cost of compensation insurance at a reasonable level, but more from the conviction and experience that the higher the compensation schedule, the more frequent malingering and fraudulent claims by some injured employees. To the degree to which effective safeguards against these unjustified claims are developed and put into practice, the opposition to a liberal compensation schedule will lose much of its present potent force. Stringent enforcement of the injured employee's duty to give prompt notice and to accept willingly adequate medical care by the employer's physician even during the whole period of disability, if the latter so chooses, is perhaps the most effective of these safeguards.

The tendency to malingering has also a direct relationship to what is commonly called the waiting period under a compensation law. Two weeks is the common provision in the law; some laws, however, have a waiting period of only one week and the general tendency toward a shorter waiting period is seen in the recent amendments to compensation laws, reducing that period from two weeks to ten days and in some instances to even one week. This situation warrants very careful, unbiased consideration. When disability continues beyond two weeks, then, with few exceptions, physicians are able to determine quite definitely whether or not continued unfitness for work exists. Many more might try to simulate disability if the waiting period were of one week's duration only. Some states have compromised the situation by providing that compensation payment shall be due from the beginning of disability, if the latter should continue beyond two weeks. Such a provision offers great inducement to prolong the disability period. A retroactive proposition obviously seems unwise.

Data supplied by a member company show the extent to which disability varies in different departments. Employment on work cars appears to be the most hazardous, on roadway and buildings next in order, and the work of linemen third in order of hazard, showing 4.47 per cent, 1.34 per cent and 0.74 per cent days disability to days worked respectively. The class of motormen and conductors shows 0.19 per cent disability.

In those states where compensation laws have been in effect the longest and where comparative data have been compiled, costs under the usual scales of compensation have at first been proportionately higher under the law than under the conditions obtaining prior thereto. Safety campaigns, better selection of employees, the application of safeguards to machinery and the more continuous use of safety appliances, however, have tended to bring down the cost of industrial injury compensation. It is quite improbable that any member company now operating under such laws would be willing to return to the old conditions.

## National Safety Congress This Week

THE fifth annual congress of the National Safety Council, which was held in Detroit, Mich., from Oct. 17 to 20 inclusive, was attended by about 1200 delegates, including a number of electric railway men. Sectional meetings devoted to public utilities, electric railways and public safety were held on Tuesday, Wednesday and Thursday, respectively. Abstracts of some of the papers will be printed in a later issue of the ELECTRIC RAILWAY JOURNAL.

A list of the electric railway section papers was printed in the issue for Sept. 30. In addition to the papers delivered before the section itself there were other papers of value to railway men, notably one on "Station Safeguarding," by Charles Penrose, Philadelphia Electric Company, and others on public safety.

R. W. Campbell of the Illinois Steel Company presided over the public safety meeting in the place of Edward C. Spring, Lehigh Valley Transit Company, who was detained by business. Perhaps the most interesting single feature of the electric railway section was the records given of the rapidly increasing number of collisions with automobiles.

At the meeting on Oct. 20, H. A. Bullock, Brooklyn Rapid Transit Company, was elected chairman and Edward C. Spring, Lehigh Valley Transit Company, vice-chairman of the electric railway section. L. R. Palmer of the Department of Labor and Industry of Pennsylvania, was elected president for the ensuing year of the National Safety Council.

The papers and discussion brought out clearly the influence which safety considerations are having upon all lines of industrial and public utility work. The earnest interest in the proceedings shown by the delegates indicated that the safety movement is taken seriously from both the economic and humanitarian standpoints.

As an adjunct to the congress a safety exhibit was held in the armory located at Larned and Brush Streets. While no electric railways exhibited, there were steam railroad exhibits, and many safety appliances applicable to electric railways were shown. The meetings were held on the second floor of the Hotel Statler.

## Attendance at the Atlantic City Convention

The registration figures at the Atlantic City convention last week, as compared with those at the 1914 convention, are given below. Comparison is made with the 1914 convention as that is the last one that was held at Atlantic City.

	1916	1914
Officials of the different associations.....	66	31
American Association .....	248	196
Accountants' Association.....	125	101
Claims Association .....	81	75
Engineering Association .....	547	360
Transportation & Traffic Association.....	300	158
Individual Members .....	44	73
Ladies .....	725	416
Guests .....	231	144
Manufacturers .....	904	900
	3,271	2,454



# Mechanical and Electrical Features of the C., M. & St. P. Locomotives

Details Are Published for the First Time Regarding the Method of Regenerative Braking with D.C. Motors, Also Regarding the Mechanical Construction of the 288-Ton Locomotives Which Have 450-Hp. Axle-Mounted Motors and Operate Satisfactorily at 65 m. p. h. in Passenger Service



C., M. & ST. P. LOCOMOTIVES—FREIGHT TRAIN DESCENDING 2 PER CENT GRADE ON EASTERN SLOPE OF ROCKY MOUNTAINS

THE locomotives for the Chicago, Milwaukee & St. Paul Railway's electrification, which has been discussed in various past issues of the *ELECTRIC RAILWAY JOURNAL*,\* possess more than ordinary interest through their many novel features, the most notable among these being the use of 3000-volt direct-current and the adoption of direct-current regenerative braking. These locomotives were first placed in regular service in December, 1915, so that some of them have had practically one year's service. During this period the engines have been operating most successfully, permitting an increase in train load on maximum grades from 1700 tons to 2500 tons, and an increase of speed from 8 m.p.h. to 15 m.p.h. At the same time there has been a reduction in the number of helper engines on the grades, and half of the dispatchers originally employed are now able to handle trains on the 226 miles of route that are electrically operated at the present time. Indeed, according to C. A. Goodnow, assistant to the president Chicago, Milwaukee & St. Paul Railway, who is in charge of the electrification, the installation has been such a tre-

mendous success that the fact of the existence of the Continental Divide has been altogether forgotten.

## MECHANICAL DETAILS OF THE LOCOMOTIVE

The decision to use 3000-volt direct current for the Milwaukee locomotives followed a careful study of the relative cost and other features of split-phase and alternating-current systems and of the other practical direct-current voltages. This review showed figures and operating characteristics favorable to direct current with but little difference in the investment between 3000 volts and 5000 volts. However, the investment in copper for the former case was transferred to investment in locomotives for the latter case, and copper was obviously subject to less depreciation and maintenance than in the case of rolling stock. Further, as the investment for substations and copper was sufficient for a material increase in traffic, such locomotives as might be subsequently purchased, if built for 5000 volts, would continually add the burden of a higher cost. As installed, the initial investment for the 440 route-miles of the electrification will be something less than \$30,000 per mile, according to figures published by the railway company.

The first of the four engine divisions to be electrified by the Milwaukee extends through a most difficult sec-

\*Among the previous articles on this installation in the *ELECTRIC RAILWAY JOURNAL* are the following: Nov. 21, 1914, Construction Plans; Dec. 19, 1914, Operating Plans; June 5, 1915, Locomotive Design; Oct. 16, 1915, Substations and Overhead; Dec. 18, 1915, Operating Tests; March 4, 1916, Switching Locomotives; April 1, 1916, Features of Operation; June 17, 1916, Operating Notes.





C., M. &amp; ST. P. LOCOMOTIVES—RUNNING GEAR FOR ONE HALF-UNIT

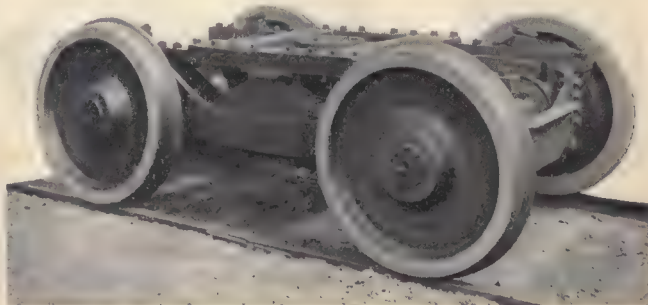
tion of the Rocky Mountains. During the past year, however, this division has been operated by the electric equipment without any apparent difficulty, not only keeping the road clear of congestion, but almost universally making up time that had been lost on adjoining steam-operated portions of the road. From the mechanical standpoint, the electric locomotives that have been making this remarkable record are of unusually large size, the principal dimensions being as follows:

Maximum tractive effort.....	132,500 lb.
Continuous tractive effort.....	71,000 lb.
Length overall.....	112 ft. 0 in.
Total wheel base.....	102 ft. 8 in.
Width overall.....	10 ft. 0 in.
Height, pantograph lowered.....	16 ft. 8 in.
Rigid driving wheel base.....	10 ft. 6 in.
Rigid guiding wheel base.....	6 ft. 0 in.
Diameter driving wheel.....	52 in.
Diameter guiding wheel.....	36 in.
Size main driving journals.....	8 in. x 14 in.
Size guiding journals.....	6½ in. x 12 in.
Total weight.....	576,000 lb.
Weight on drivers.....	450,000 lb.
Weight per driving axle.....	56,250 lb.
Spring borne weight per driving axle.....	40,000 lb.
Dead weight per driving axle.....	16,250 lb.
Weight on guiding wheels.....	126,000 lb.
Weight per guiding axle.....	31,500 lb.
Spring borne weight per guiding axle.....	27,274 lb.
Dead weight per guiding axle.....	4,226 lb.
Maximum tractive effort in per cent of weight on drivers.....	30 per cent
Continuous tractive effort in per cent of weight on drivers.....	16 per cent
Normal braking power in per cent of weight on drivers.....	89 per cent
Normal braking power in per cent of total weight..	69 per cent

The locomotives, which were built by the General Electric Company, are each made up of two duplicate sections, each section having a cab mounted on two driving trucks, of which one is unsymmetrical in that it has an extended frame to carry the draft rigging and the center pin for the guiding truck. The guiding truck is of the well-known equalized type common to steam locomotives, and it carries the load on a center bearing through a bolster which provides 4 in. of lateral movement each way from the center against a constant pressure. The riding characteristics have been most satisfactory, speeds of 65 m.p.h. being attained in passenger service. There is absolutely no nosing on tangent track.

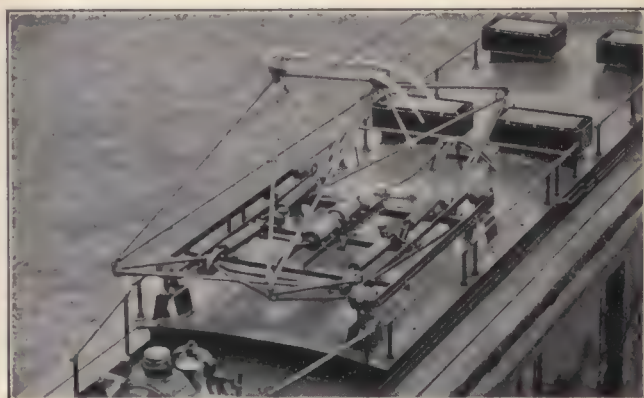
In the driving trucks the side frame, transoms and

other parts taking longitudinal stresses are designed to withstand a 500,000-lb. static pressure with liberal factors of safety. The side frames are of cast steel 4½ in.



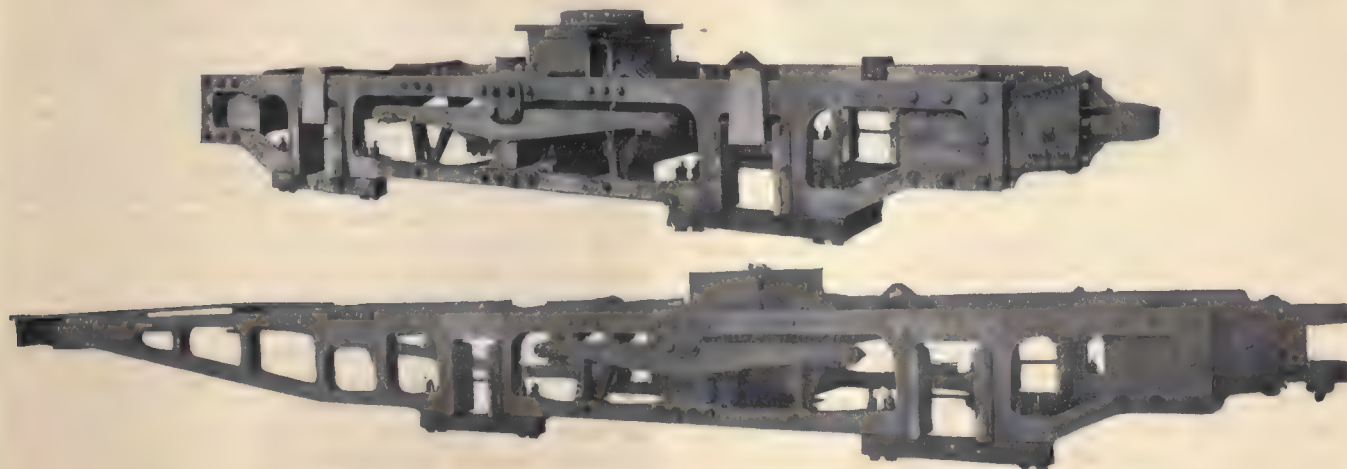
C., M. &amp; ST. P. LOCOMOTIVES—GUIDING TRUCK

thick placed on 80-in. centers. Midway between the wheels on each of the trucks is a hollow cast-steel transom with supporting lugs for the nose of the traction motors, and ventilation from the blower in the cab is



C., M. &amp; ST. P. LOCOMOTIVES—DOUBLE SHOE PANTOGRAPH AND VENTILATORS ON CAB ROOF

transmitted through this direct into the motors. The equalizing arrangement for each driving truck is similar to that used upon steam locomotives. No vertical

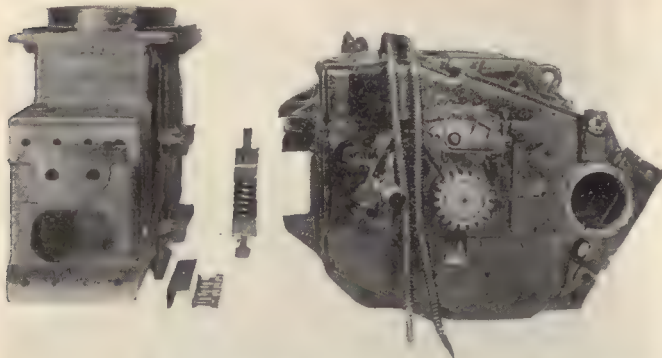


C., M. &amp; ST. P. LOCOMOTIVES—FRAMES OF SYMMETRICAL AND UNSYMMETRICAL TRUCKS



play is allowed in the hinge between the trucks for each half unit, but it is provided in the hinge joint between the two half-locomotives.

The frames are provided with pedestal shoes at the journals so that when the shoes are dropped the journal boxes can be removed from place without lifting the frame. This makes it convenient to renew the thrust



C., M. & ST. P. LOCOMOTIVES—DISSEMBLED VIEW OF NOSE-SUSPENSION OF MOTOR ON TRANSOM

plates which are provided at the back of each box. The motors are supported in the usual way directly on the axle at one side, and by a nose bracket through double-acting springs to the bolster in the other side. The motors drive through flexible gears that are mounted directly on the axle, one at each end of the motor.

The superstructure of each section of the locomotive is made up with two 12-in. longitudinal center sills placed 31 in. apart, this forming a box girder and providing for an air duct to conduct the ventilating air from the blower to the motors. A secondary floor of 6-in. channels forms ducts for the wiring conduit and serves as a floor for the cab. The cabs are built in the usual way, with ventilating louvres in the sides. Each is divided into two compartments, consisting of the main apparatus cab, 47 ft. long, and the motorman's cab, 5 ft. long. The apparatus cab is arranged with an aisle



C., M. & ST. P. LOCOMOTIVES—VIEW OF 450-HP. MOTOR SHOWING VENTILATING AIR INTAKE

23 in. wide that extends for the entire length on each side, with compartments for the control and other apparatus arranged in the middle, hatches being provided in the roof for handling all apparatus with overhead cranes. The motor-generator set, the blower and the compressor are carried directly on the box girder forming the main air duct.

In the compartment for rheostats and switches the rheostats are supported near the floor, and above them are mounted the contactors. Ventilating flues leading from the rheostat compartment through the roof provide natural ventilation, air being taken through openings in the floor. The front of the contactors and switches is accessible from a center aisle into which all contactors face, thus providing liberal arcing space. This arrangement of rheostat and contactor compartment has been found particularly desirable on account of the ease of inspection and removal of parts that need replacement. By this means also all of the high-tension apparatus that might be a source of danger is safely inclosed.

#### MOTORS

The motors used with these locomotives are the largest of the axle-mounted type that have been used in the electrification of steam railways. They are known as the General Electric type 253. Based on the A.I.E.E. standard method of rating, their one-hour rating is 452 hp., and the continuous rating, based on a temperature rise of 100 deg. C. in the armature and 120 deg. C. in the fields, is 396 hp. These ratings are for a poten-



C., M. & ST. P. LOCOMOTIVES—DISSEMBLED PARTS FOR FLEXIBLE GEAR

tial of 1500 volts, two motors being coupled permanently in series for operation on 3000 volts from the line. The motor is designed for operation with an external blower and the volume of air at the continuous rating approximates 2500 cu. ft. per minute. The air is blown into the motor through a large opening on the front of the magnet frame at the commutator end, then passes in parallel streams through the armature and over the field coils, and is exhausted through openings in the magnet frame and bearing head at the opposite end.

Each motor complete, including spring gears, pinions, gear case and axle lining, weighs 14,860 lb. It has four main poles and four commutating poles, and is designed for field control, the field being shunted 50 per cent in motoring at full speed. The armature has forty-nine slots with seven coils per slot, and the commutator 343 segments. The armature has a single-turn winding, and the diameter of the armature core is 29½ in., the coils being insulated with mica and asbestos. At the one-hour rating the speed of the armature is 446 r.p.m. There are four brush holders per motor, each having two brushes 11/16 in. x 1¾ in.

The main field coils are wound with strip copper in two sections with asbestos between turns. They are insulated with mica and asbestos, and have a final wrapping of strong cotton tape. The commutating coils are made of edgewise-wound strip copper, and are insulated in a similar manner to the main field coils. The main exciting field coils are not subjected to full volt-



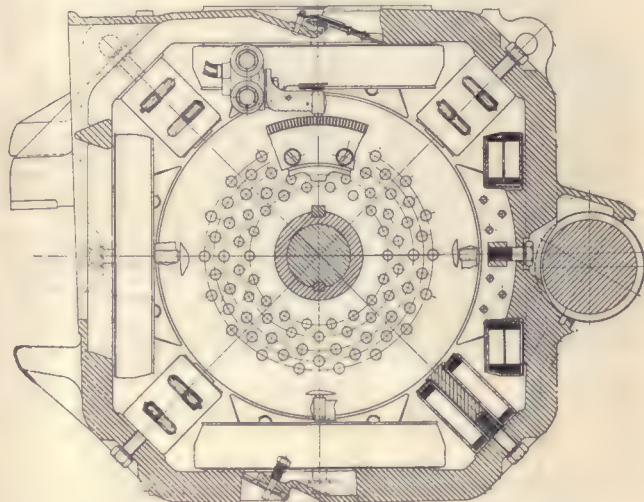
age, since the armatures of two motors are connected in series with the fields of both motors on the ground side. The clips connecting the top and bottom bars at the back end of the armature are electrically brazed to the bars, thus insuring a reliable connection at any abnormally high temperature which might occur at excessive overload. The magnet frame is made of cast steel, and except in size differs but little in general appearance from standard box frame railway motors.

The commutating characteristics of the motor are excellent, and it has been found possible to raise the voltage on a stand test 50 per cent above normal without injurious sparking. When the motors are regenerating at voltages materially higher than 3000, the fields can be shunted to a surprising extent without appreciable sparking.

The motor has twin gears with a 4-in. face and two-pitch. For the freight locomotive the gear ratio is 18:82, and for the passenger locomotive 29:71. Both gears and pinions are made of high-carbon, oil-treated stock, having an elastic limit of 85,000 lb. per square

the heavy currents that obtain in the service. Sparking is entirely eliminated, although the current required for a single locomotive at continuous rating is 840 amp., and in passenger service speeds up to 60 m.p.h. are attained.

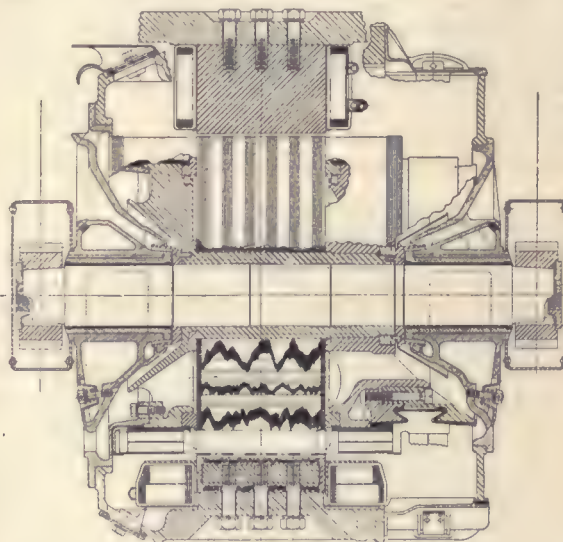
The motorman controls the operation of his pantograph by means of an air valve, which admits air to a pair of cylinders energizing powerful springs, the latter in turn raising the pantograph and at the same time



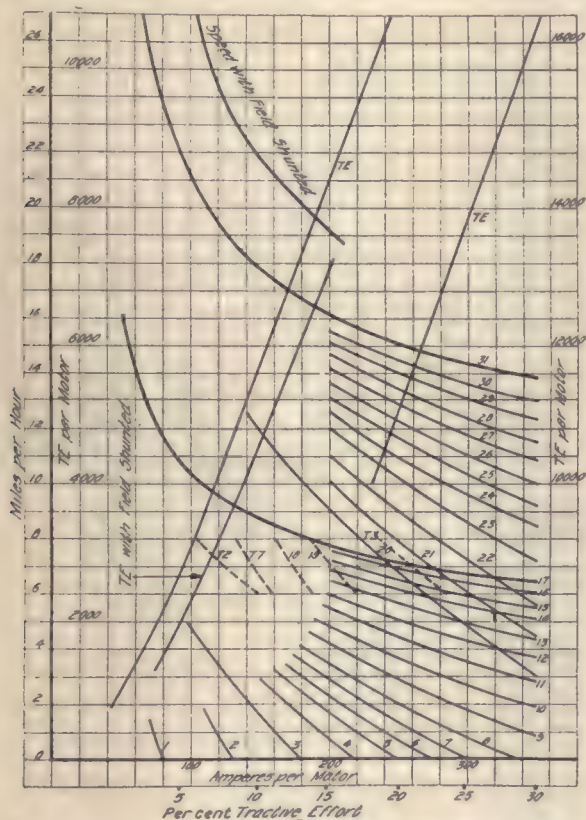
C., M. & ST. P. LOCOMOTIVES—TRANSVERSE CROSS-SECTION OF MOTOR

regulating the pressure against the trolley wire. The range of action of the shoe is between 17 ft. and 25 ft. above the rail. An auxiliary trolley pole with a swivel base is supplied to collect current for the air compressor when the locomotive is first put into service. The two pantographs on each complete locomotive are connected by a bus line so that the duplex electrical equipment can be supplied from either one.

Great importance has been accorded to the design of the main emergency switches and fuses, and accordingly



C., M. & ST. P. LOCOMOTIVES—LONGITUDINAL CROSS-SECTION OF MOTOR



C., M. & ST. P. LOCOMOTIVES—CHARACTERISTIC CURVES FOR VARIOUS CONTROL POINTS, AND SERIES-PARALLEL TRANSFER STEPS FOR 1500-VOLT FREIGHT-SERVICE MOTOR WITH GEAR RATIO OF 18 : 82 AND 52-IN. WHEELS

inch. In service the motors have operated with excellent results, and there is no noticeable gear noise or vibration while the locomotives are in motion. At present the motors run at a comparatively low temperature because their capacity is sufficient to handle heavier trains than originally contemplated.

#### CURRENT COLLECTION AND CONTROL

As mentioned in previous articles the locomotive has two pantographs, one mounted on each half unit of the locomotive. Each pantograph has two sliding contacts or shoes, which are provided with copper wearing strips, and further provision for increased contact area is obtained by the use of double-contact wires of copper for the overhead catenary system. With the four points of contact at the pantograph it becomes easy to collect

these devices are mounted in a separate high-tension compartment. The trolley lead, starting from the pantograph, first enters this high-tension compartment and is divided into main and auxiliary circuits therein. From the main switch and fuse the main power lead goes directly to the controlling apparatus of the trac-



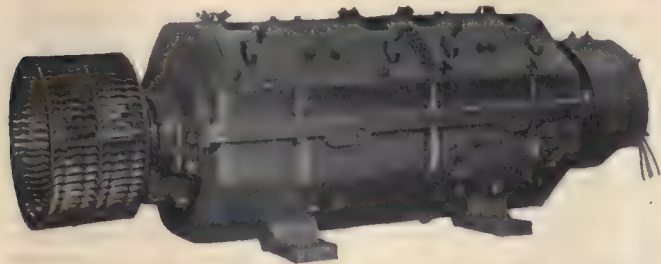




power for the master control circuits, cab lights, head-light and other low-voltage auxiliary circuits.

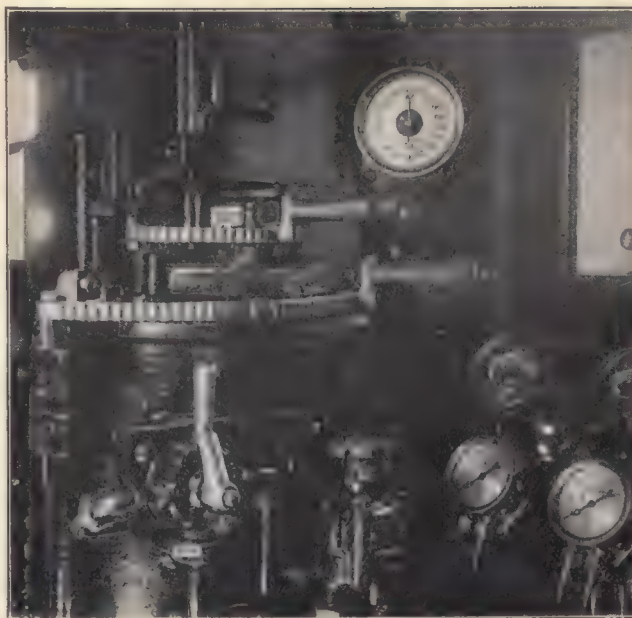
#### REGENERATIVE ELECTRIC BRAKING

Regenerative electric braking is, doubtless, the most interesting feature of the control equipment. With the simple direct-current motor adopted for the Milwaukee



C., M. & ST. P. LOCOMOTIVES—MOTOR-GENERATOR SET WITH FAN HOUSING REMOVED

locomotives, operation as a motor or a generator depends upon whether the trolley voltage at the locomotive is above or below the voltage at the motor terminals. Hence, when the locomotive descends a grade and is to brake regeneratively, it is necessary only to effect an increase in the voltage across the motor terminals so that power is pumped from the locomotive into the transmission system. The means for thus raising the voltage level of the motor rests in the use of the before-mentioned exciter, which is so connected as to super-excite the traction motor fields. By properly proportioning the design of the exciter for its service, the stable characteristic of the series motor is inherent in the braking connection as in the motor connection. Since the generative function is a reversal of the motor function, the traction motors provide in regeneration that, with an increase in speed, there is an automatic increase in braking effort, and with a decrease in speed there is an automatic decrease in braking effort, a definite torque corresponding always to each particular speed and voltage. The fact that this stable characteristic is closely maintained during regenerative braking is one of the greatest contributing elements to the success of electric braking in this service, because it permits operation down grades at constant speed with but little regulation by the motorman, except as changes in grade or curves produce large variations in the intensity of braking power required.

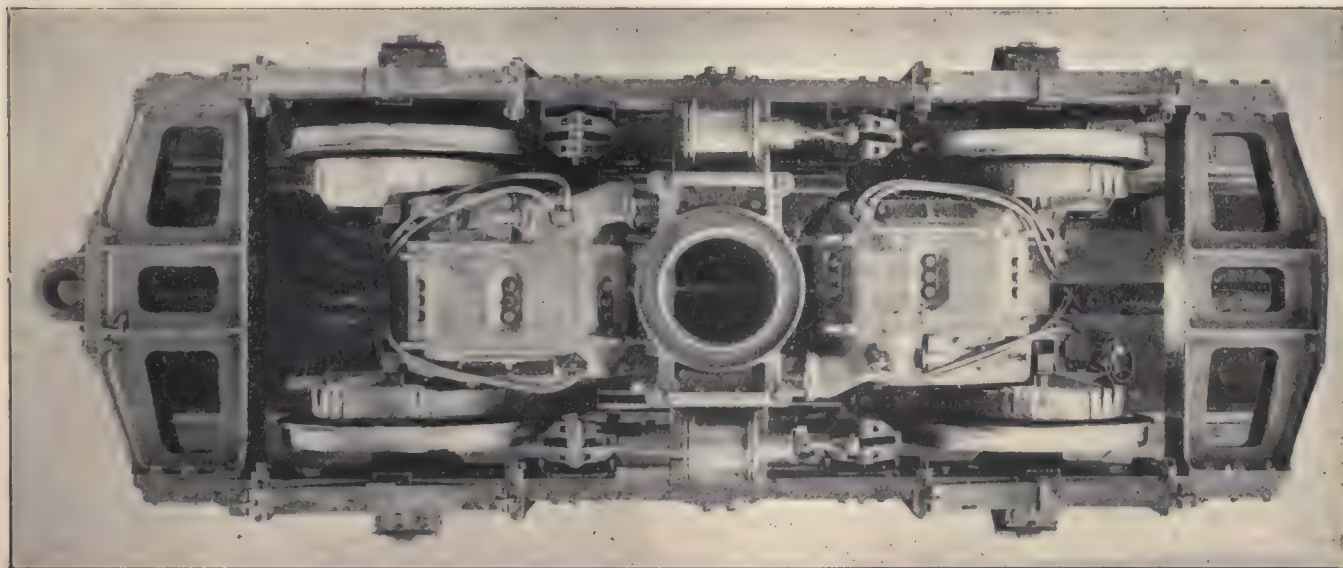


C., M. & ST. P. LOCOMOTIVES—INTERIOR VIEW OF MOTORMAN'S CAB SHOWING CONTROLLER AND ELECTRIC-BRAKING HANDLES AND OPERATING GAGE BOARD

So far as the motorman is concerned the operation is simple. When motoring he varies his tractive effort by changing the resistance in series with his traction motors, thereby limiting the amount of power to be expended in the motors. When braking he merely changes the resistance in the shunt field of his exciter, thereby regulating the increment of voltage above the line, the returned power reacting as a braking effort.

The equipment used in producing this result includes a small controller inverted upon the large master controller, the handle for the former being used for varying the intensity of the retarding torque, which may be accomplished when the motors are running either in full series or full parallel. An illuminated ammeter and gage panel is located directly in front of the motorman. This is provided with a center-zero ammeter for the line, and a field ammeter, which measures the current in the traction motor fields when they are being super-excited during regeneration. Red marks are located on the ammeter scales to show when the continuous capacity of the motor is being exceeded.

The exciter current for strengthening the main motor



C., M. & ST. P. LOCOMOTIVES—TOP VIEW OF DRIVING TRUCK SHOWING VENTILATING AIR INLET IN CENTER PLATE



fields is controlled by a specially-designed motor-driven controller which is regulated by the braking handle on the master controller. To assist in multiple-unit operation so that the different sets of motors will properly divide the load, a current-limit relay is used in the system of connections between the master controller and the exciter field controller to fix the setting of the latter.

Emphasis may well be laid upon the ease and simplicity of operation of the regenerative system by noting the fact that, during the past year of operation, steam locomotive engineers have been intrusted with the electric locomotives after having but a few days of instruction. In the first days of operation the electric locomotives were even pooled with the steam machines, and an engineer would not know until he was called whether he was to take out an electric locomotive or a steam machine.

Under regeneration the regular operation of the locomotives is not interfered with in any way, electric braking being immediately available at any time. If the speed of the train on any grade reaches a higher point than desired before braking is applied, the electric brake can be put on very slightly and gradually brought up to the point required to slow down the train and hold it at the desired speed. The regenerative control is entirely automatic, and the braking effort is held constant for any definite setting of the braking controller, being entirely independent of changes in trolley voltage, distance from substations or from the nearest locomotive, changing grades, etc. In effect, the locomotive under regeneration acts exactly the same as a porta-

ble substation that is moving between the permanent substations but is electrically and physically connected to the substation busbars. The substation generators fix the voltage and the locomotive must generate this voltage plus the voltage drop due to current returning to the substation busbars. If power is fed into another locomotive, the generated voltage is dependent upon the drop in voltage due to the load taken from the substation by the locomotive that is not regenerating. It is possible for one train descending a grade to take a lighter train up the other side of the mountain with all power passing through the substation busbars, but without the delivery of any power from the substation, the generating apparatus merely floating on the line and determining the trolley voltage.

In past years it has always been considered necessary to figure on a larger motor for electric braking than would ordinarily be used, because in this case the motor would be operated continuously, but the internal ventilated type of motor that is installed on the Milwaukee locomotives has such a high continuous capacity that it can be operated continuously at the normal locomotive rating without being overheated. In brief, the advent of the commutating-pole motor, with its greatly increased commutating capacity and its rugged construction, has contributed most largely to the establishment of direct-current regeneration, because the standard commutating-pole motor automatically becomes an excellent generator, when driven by the weight of the locomotive and train on down grades without necessity for adding to the weight of the motor or changing its fields or connections.

## American Association News

President Phillips of the Engineering Association Announces the Appointment of Committee Chairmen—Scale of Dues for Manufacturing Members—Meetings of Company Sections in Chicago, New Haven and Milwaukee Were Addressed by Prominent Speakers and Showed Good Attendance

### Engineering Association Appoints Committee Chairman

Immediately following the last session of the Engineering Association meeting at Atlantic City, President Phillips called a meeting of the executive committee. Among other items of business the president was authorized to appoint a special committee to confer with the United States Bureau of Standards on the National Safety Code. He was also authorized to appoint a delegate to the Good Roads Congress. A tentative plan of subjects for the consideration of the new committees was also submitted.

President Phillips then announced the appointment of officers of committees as follows: H. H. Adams, Chicago Surface Lines, secretary standards committee; C. H. Clark, Cleveland Railway, chairman way committee; J. W. Welsh, Pittsburgh Railways, chairman power generation committee; C. L. Cadle, New York State Railways, Rochester, N. Y., chairman power distribution committee; E. R. Hill, consulting engineer, New York, chairman committee on heavy electric traction; C. S. Kimball, Washington Railway & Electric Company, chairman committee on buildings and structures; L. P. Crecelius, Cleveland Railway, chairman committee on engineering-accounting, and W. G. Gove, Brooklyn Rapid Transit System, chairman committee on equipment.

President Phillips named as the special committee to confer with the Bureau of Standards: C. L. Cadle,

chairman; J. W. Welsh, co-chairman; W. G. Gove, C. S. Kimball and E. R. Hill.

### Chicago Elevated Section Inaugurates Educational Talks

The meeting of the Chicago Elevated Railroad Company Section, held recently, was attended by 150 members and guests. The meeting was largely taken up with power matters, W. O. Barnhart, chief power supervisor, being the principal speaker. He first described visits made by the section during the summer to the great Fisk Street and Quarry Street power plants of the Commonwealth Edison Company, later giving a talk on "An Explanation of Electrical Terms." As explained by President H. A. Johnson, the latter was the first of a series of fifteen-minute educational talks on subjects pertaining to the operation of the elevated railroads. These talks are to be followed by general discussions. It was expected that John W. Bunn, Galena Signal Oil Company, would deliver an address on "Signal Oil," but he was obliged to postpone his talk.

Several items of business were disposed of at the meeting, among which were the election of J. H. Mallon, safety engineer, as section delegate to the Atlantic City convention, and the appointment of a nominating committee to prepare a slate for the election which occurs at the meeting. During the evening the members were entertained with music and crayon drawing, the latter to piano accompaniment.



## Scale of Dues for Manufacturing Members

In the report published last week of the new scale of dues for manufacturing members of the association, as adopted at the Atlantic City Convention, the scale quoted by error was that for foreign members of the association. The action taken at Atlantic City was to make dues for manufacturing members uniform with those of railway companies. These dues in both cases are based on gross earnings from electric railway operation or from the business of manufacturing or selling material for electric railways, or from other electric railway operation in the preceding fiscal years of the respective members, and are as follows:

Gross Receipts		Dues Annual
Under	\$50,000.....	\$25
Between	50,000 and 100,000.....	50
Between	100,000 and 250,000.....	75
Between	250,000 and 500,000.....	125
Between	500,000 and 1,000,000.....	175
Between	1,000,000 and 2,000,000.....	225
Between	2,000,000 and 3,000,000.....	275
Between	3,000,000 and 4,000,000.....	325
Between	4,000,000 and 5,000,000.....	375
Between	5,000,000 and 6,000,000.....	425
Between	6,000,000 and 7,000,000.....	475
Between	7,000,000 and 8,000,000.....	525
Between	8,000,000 and 9,000,000.....	575
Between	9,000,000 and 10,000,000.....	650
Between	10,000,000 and over.....	750

## Meeting of Connecticut Company Section

At a meeting of the Connecticut Company Section in New Haven, Sept. 19, A. L. Donnelly, assistant engineer of the Connecticut Company, read a paper on the maintenance of way department and its relations with the operating department.

After saying that the work of this department includes the maintenance and construction of track, pavement and bridges, Mr. Donnelly explained that for maintenance of way purposes the 746 miles of the system is divided into three sections, assistant engineers being in charge of each section. There are six engineers in the field and office corps, with two additional men during the summer. The track work is in charge of four roadmasters. The department holds a "roadmaster's meeting" once a month from October to May or June, during which the work done during the past summer and that proposed during the next season is discussed. Pavement repairs are made by the track department, but pavement construction, including reconstruction of old pavement, is let out on contract. Last year \$1,149,561 was spent for track and roadway maintenance and construction. The department keeps in close touch with the operating department on all matters of mutual interest. The reading of the paper was accompanied with lantern slides.

After the conclusion of this paper, J. F. Berry of the legal department read a paper on "Some Trial Experiences and Other Observations," after which Col. N. G. Osborn of the *Journal-Courier* gave a talk on "The Obligations Between Electric Railways and the Public."

In the general business meetings P. Ney Wilson, chairman of the committee appointed to investigate snow fighting methods and equipment, said that the report on that subject would be presented at the next meeting of the section.

## Standard Schedule for Milwaukee Meetings

The Milwaukee Company Section (Section No. 1) held its first meeting of the season on Sept. 21. This was also the first meeting to be held under the new schedule adopted at the previous council meeting, according to which the plan for future meetings is as follows:

1. The chairman of the program committee will consult with the various heads of departments in regard

to the appointment of a man to present a paper on current events in his department. As there are nine departments represented in the company section, this will give material for nine meetings. It was suggested that the first paper be presented from the transportation department.

2. At each meeting there will be an outside speaker when one can be procured to present a subject appropriate for the occasion.

3. At each meeting there will also be an entertainment feature, such as a musical number or short act, between the reading of the two papers.

4. The president will appoint a booster committee with a member from each department to boost the attendance at the meetings.

5. Individual notices will be sent in advance to each member of the regular meetings giving the features to be presented.

At the meeting on Sept. 21, R. H. Pinkley, engineer of way and structures, gave an account of a trip which he had taken through the Far West and told of the points of electric railway interest which he had seen. Slides were used to illustrate the talk. Following this address was a musical number. Harry Wunderlich, supervisor of the transportation department, then gave a talk on the current events in his department, including an account of the methods used to handle the transportation of large masses of people at parks, picnics, places of amusement, etc. When such extra transportation is required, orders are issued in advance to each station as to the number of cars it shall supply and to each supervisor as to just what is expected of him.

The usual review of the technical press, dated Sept. 21, 1916, was also distributed at the meeting.

## COMMUNICATIONS

### A Few Letters on the Convention Issue

LOS ANGELES RAILWAY

LOS ANGELES, CAL., Oct. 8, 1916.

To the Editors:

I am in receipt of the Convention Section of your journal for Sept. 30. When a person does an extra good thing, I think it due him that he should be told of it. I have been a constant reader of your publication for many years, and I feel that the fraternity will vote your latest effort in convention numbers as being the best and most useful you have brought forth.

E. L. LEWIS, Superintendent.

DALLAS, TEX., Oct. 10, 1916.

To the Editors:

On my return from a "visiting trip" among some of our members in the western part of the state, I found your issue of Sept. 30 on my desk and have spent most of my leisure time since then in reading it. I am not yet through with it and I have put it on my desk among my books of reference where it will be used quite constantly within the next few months, as the jitney has made the "car" the most important question of the moment.

I am, as you know, somewhat of a crank on the subject of the usefulness of the trade and technical journal, and if there is an electric railway official anywhere who cannot obtain at the least a year's subscription value from the perusal of this single number of the JOURNAL, then he is either impermeable to new ideas or his property is so perfect that he ought to tell us all about it.

H. S. COOPER.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Combination Car for City and Interurban Traffic—Recent Tests on Steel Conductors—Labeling Fuses Prevents Accidents—Recent Induction-type Time-limit Relay—Pit Lighting in New Car Shops—Combination Outdoor Metering Set—Other Articles of Practical Interest

### All-Steel Center-Entrance Cars for Interurban Service

This Car Has Been Developed for Service on All  
Lines, Combining the Virtues of Recent  
City and Interurban Types

BY H. R. FEHR

President and General Manager Lehigh Valley Transit Company,  
Allentown, Pa.

The Lehigh Valley Transit Company operates 215 miles of electric railway in eastern Pennsylvania, located mainly in the counties of Lehigh and Northampton, and serving Allentown, Slatington, Easton, Bethlehem and South Bethlehem, together with numerous other towns and boroughs. Connections are made on the north with the Delaware Water Gap, and on the south cars are operated directly into Philadelphia. The cement and slate industries of this section are far-famed, and the great works of the Bethlehem Steel Company at South Bethlehem stand foremost among the large and varied manufacturing plants located on its lines.

At the beginning of the year it was decided to purchase additional passenger equipment to meet the rapidly increasing business, and it appeared advisable to design a car which could be used equally well either in local or interurban service. Heretofore the interurban cars used between Allentown and Philadelphia, a distance of 55½ miles, weighed 41 tons, whereas the city cars weighed 26 tons, so that each type was limited to its own special service. Therefore, a detailed study was made of all existing conditions, such as clearances, grades, schedules, etc., and future needs were estimated as far as possible, with the result that plans and specifications were drawn up by superintendent of equipment Harry Branson and the writer for a universal car of the double-end, all-steel, center-entrance type, adapted for operation on all lines equally well, and weighing

complete 34½ tons. From Norristown to Sixty-ninth Street Terminal, Philadelphia, a distance of 13½ miles, the Lehigh Valley Transit cars operate over the tracks of the Philadelphia & Western Railway, so have to be

equipped for third rail operation. For current collection over the remainder of the line they are equipped with Miller trolley shoes and the usual trolley poles.

Twelve cars were ordered from the Southern Car Company and these were received and placed in operation early in September. They met with the instant approval of the public and the trainmen, and have more than justified the original expectations of the management.

The cars are mounted on Brill M.C.B.-2X trucks, with 36-in. rolled steel wheels, with a 3½-in. tread, and equipped with Westinghouse 547-A motors, with ALM control, and Westinghouse straight and automatic air brakes, Schedule A. M. M. Safety and comfort were not sacrificed in



MOTORMAN'S CAB SHOWING BRAKE  
AND CONTROL APPARATUS



A TWO-CAR LIMITED TRAIN ON THE LIBERTY-BELL ROUTE OF THE LEHIGH VALLEY RAPID TRANSIT COMPANY



favor of weight in the design of these cars, as is so often the case, and the easy riding qualities of these cars are worthy of mention.

The general dimensions of these cars are as follows:

Length over bumpers.....	50 ft.
Width over all.....	8 ft. 10 1/2 in.
Width of aisle.....	23 1/2 in.
Height from rail to top trolley base.....	12 ft. 6 in.
Truck centers.....	29 ft. 6 in.
Diameter of wheels.....	36 in.
Wheelbase of trucks.....	6 ft. 6 in.
Step heights:	
Rail to top of first step.....	15 1/4 in.
First step to second step.....	13 1/2 in.
Second step to floor.....	11 1/2 in.
Entrance width in the clear.....	4 ft.
Ramp of floor from bolster to center.....	5 in.
Seating capacity.....	60
Weight.....	69,200 lb
Weight per seated passenger.....	1,153 lb

The miscellaneous equipment includes Tomlinson couplers, Rico anti-climbers, Edwards sash fixtures, Curtain Supply Company's curtains, Automatic ventilators, Horne double acting hand brakes, Western Electric push buttons and buzzer system, Ohmer registers, National Pneumatic Company's manual door devices, and Keystone illuminated signs.

The car body is all steel, with arch roof, steel tee posts, and with pan floor construction, of No. 18 gage sheet steel, divided to meet cross and longitudinal members. On the steel floor are laid 7/8-in. maple, 1-in. cork and 5/16-in. linoleum, the only other wood besides the floor reinforcements, being in the sash, doors and in-



VIEW SHOWING INTERIOR ARRANGEMENT ON CARS OF LEHIGH VALLEY TRANSIT COMPANY

side ceiling trim. The use of cork, linoleum and agasote will insure warmth in winter and coolness in summer.

The interior of the car is constructed on the most sanitary lines, and with the elimination of all dust collecting pockets. The side windows raise 52 in. above the floor line, so as not to obstruct the view and at the same time giving ample ventilation in warm weather. The lighting system is of the center type. Heat is furnished by a Cooper B-5 forced ventilation hot air heater in conjunction with Consolidated electric heaters. On each end the motorman's compartment is placed at the right of the car, thereby giving an extended view through the observation windows to the passengers, who have not hesitated to express their approval of this feature. In one end of the car is a large smoking compartment seating thirteen, with Hale & Kilburn latest type "Walkover" seats with embossed pressed steel arm rests and Chase leather finish. The cross seats in the balance of the car are of the "Walkover" type, finished in green plush. In the center of the car are four

longitudinal seats, and there are three folding seats and one stationary seat at each end.

In the opposite end of the car, from the smoking section and just behind the motorman's compartment, is located a toilet room, finished in white enamel and completely equipped according to the most modern practice. Drinking water and paper cups are also provided.

In laying out the various pieces of apparatus underneath the car floor special attention was paid to its location in order to obtain an equal distribution of weight according to center pin and side loads, thereby eliminating all vibration and the hammer blows due to unequalization. Particular care was devoted also to the inspection and renewal of all parts.

Although there is considerable difference of opinion regarding the merits of the center-entrance car as compared with the end-entrance type, the Lehigh Valley Transit Company believes it is a question to be solved by the public and the local conditions of operation. The attitude of its patrons, therefore, toward this new type of car will be noted carefully by the management, and will be of considerable influence in determining the design of future equipment.

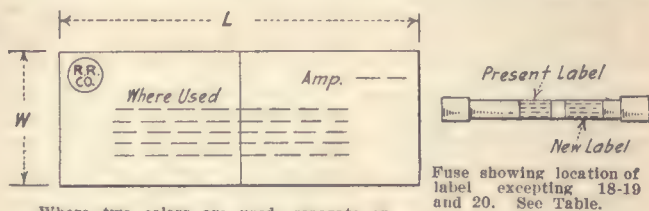
## Labeling Fuses Conduces to Safety

Additional Fuse Labels Guarantee Proper Capacity Fuses in All Circuits

BY E. D. RANSOM, B.E.

As a result of certain accidents which occurred on a large street railway system, an investigation showed the cause to be due to fuses of improper capacities in the air compressor circuit. On one occasion a motorman placed a 1-amp. fuse in this circuit where one of 8-amp. capacity should have been used. As the 1-amp. fuse did not have sufficient capacity for the circuit, it "blew," unknown to the motorman. Although sufficient air remained in the main reservoir for a few service applications there was not enough air to make a quick stop, and an accident resulted.

To all external appearances the 1-amp. and 8-amp. fuses are the same with the exception of the capacity label. Where twenty-two different fuses are used in the numerous circuits and types of equipment, the average motorman can not be expected to remember the



Where two colors are used, separate on center line.

Paper label—Gummed on one side.  
Note:—Paper to be of good quality and to receive two coats of fish glue gum.  
Labels 18-19 and 20 to be placed on fuse opposite manufacturers label.

PAPER LABEL AND FUSE SHOWING LOCATION OF OLD AND NEW LABEL

correct capacity for each circuit. This also applies to line inspectors, maintenance men and any others who must handle or replace fuses.

The accompanying drawing is of a label which is now placed on all fuses used in car circuits. The table on page 898 shows the fuses of different capacities tabulated by number, color and size of label and the location in which each is used. For example, the 15-amp. fuse bears label No. 8. It is pink in color and is inscribed to show that it can be used in No. 1 heater circuits of ele-



FUSES TABULATED BY NUMBER, COLOR AND SIZE OF LABEL

Label No.	Amperes	Where Used	L, In.	W, In.	Color
1	1	Signal bell, busser and door, center-entrance car; light-elevated, subway and surface cars.	1 1/8	3/8	White
2	2	Register, center-entrance cars.	1 1/8	3/8	Blue.
3	5	Fan motor, center-entrance cars; arc light trolley, elevated cars.	1 1/8	3/8	Light green.
4	5—Special	Battery, elevated cars.	1 1/8	3/8	Green.
5	8	Pump, No. 1 heater, surface cars.	1 1/8	3/8	Red.
6	10	Controller relay, center-entrance cars; arc light ground, elevated cars.	1 1/8	3/8	Yellow.
7	10—Special	Pump, elevated cars.	1 1/8	1	Red.
8	15	No. 1 heater, elevated cars; No. 2 heater, surface cars; pump, subway cars.	1 1/8	1	Pink.
9	15—Special	Heater, B. O. cars.	1 1/8	1	White and red.
10	25	No. 2 heater, elevated; all heaters, subway cars.	1 1/8	1	White and green.
11	30	Main heater, center-entrance cars.	1 1/8	1	White and blue.
12	35—Special	Heat and light line, elevated trailers.	1 1/8	1	Green and yellow.
13	50	Auxiliary, center-entrance cars; heat and light line, elevated motor cars.	1 1/8	1	White and brown.
14	150	Main motor, S. T. surface cars.	1 1/2	1	White and pink.
15	225	Main motor K-11 controller, surface cars.	1 1/2	1	Red and blue.
16	250	Main motor K-28-L controller, surface cars.	1 1/2	1	Red and green.
17	300	Main motor, convertible surface cars.	1 1/2	1	Red and yellow.
18	15	Emergency lights and compressor control, subway cars.	1 1/2	3/8	Red and pink.
19	20	Control, subway cars.	1 1/2	3/8	Blue and pink.
20	5	Busser, door magnets, empty and load brake and speed control, subway cars.	1 1/2	3/8	Blue and yellow.
21	3	Speed control, A. C. subway cars.	1 1/8	1	Blue and green.
22	75	Main auxiliary, subway cars.	1 1/2	1	Green and pink.

vated cars, in No. 2 heater circuits of surface cars or in compressor circuits of subway cars. The drawing shows the location of the label on the fuse, the method of attaching and instructions as to the division of coloring.

When fuses are ordered, this information is furnished the manufacturer, who properly labels all fuses before delivery. By the use of these labels the proper capacity fuse is insured in its respective circuit by any one who can read, regardless of his knowledge as to the proper capacity fuse required. In addition fuses are sorted and stored easily as it is not necessary to stop and read the capacity label.

## Steel Conductors for Transmission Lines

### Electrical Distribution Properties Include Low Cost and High Strength

Tests of the electrical properties of steel wires and cables used as conductors of alternating current show attractive possibilities from both commercial and engineering points of view for the use of steel instead of copper in certain classes of work. This statement and supplementary opinions were voiced by H. B. Dwight, Canadian Westinghouse Company, Ltd., Hamilton, Ontario, in a paper on the subject presented at the joint session of the Association of Iron & Steel Electrical Engineers with the American Institute of Electrical Engineers, held in Chicago recently. Mr. Dwight pointed out the advisability of making complete tests of American grades of steel so that transmission-line engineers may be able to learn more fully the characteristics of steel conductors and thus be better able to decide where the use of steel will prove economical and advisable.

The resistance of an iron or steel conductor is considerably greater for alternating current than for direct current. This is partly due to the skin effect, that is, the crowding of the alternating current to the outside parts of the conductor by the alternating magnetic flux in the conductor, and partly to hysteresis caused by the alternating magnetic flux in the steel. In copper or aluminum conductors of the usual size the skin effect

increases the effective resistance only 1 or 2 per cent and so is practically negligible. But in steel or iron conductors the flux has a magnetic path and so attains a value of from twenty to several hundred times as great as in a non-magnetic conductor. The result is that the skin effect is very pronounced and the effective resistance is increased by a large amount, in some cases 100 or 200 per cent or more. However, tests indicate that if the strands are moderately fine and are properly put together, the increase of resistance at 25 or 60 cycles may be kept down to a reasonably small percentage. Curves published by the *Elektrotechnische Zeitschrift*, and conclusions stated in Bulletin No. 252 of the U. S. Bureau of Standards regarding the quality of iron or steel to be used, set forth that of the wire tested, the grade with the highest resistance to direct current had the lowest resistance to alternating current, and was also the least expensive.

A large part of the magnetization is caused by the spiraling of the wires in a cable, and if the spiraling of the different groups of wires is properly reversed, the increase in effective resistance can be reduced as much as one-half. The pitch of the spiral should be as long as possible without endangering the strength of the cable.

Another point brought out that should be of particular interest to electric railway distribution engineers and manufacturers of line materials is that the iron and steel conductors have the peculiar property that the effective resistance and reactance increase to a maximum as the current is increased, and then decrease. This is evidently due to the iron becoming saturated. In most cases, especially with larger cables, the decrease is very slow and the resistance maintains approximately its maximum value for most large values of current. This property should prove useful in transmission-line work, for the conductor will have a low impedance to the normal load current but will have about twice as much impedance to the current flowing in the case of a short-circuit. The impedance will also be large to high-frequency surges caused by switching or lightning. Mr. Dwight also points out that it may prove more economical in certain cases to protect the line against short-circuits and surges by using steel conductors than by installing current-limiting reactors, or by increasing the reactance of the transformers. This property also may be of use in the case of feeders of direct-current interurban systems. If the feeder is a steel cable it will have low resistance to direct current, but high impedance to alternating current. It will, therefore, tend to damp out the suddenness of short-circuits and lightning surges which cause synchronous converters and generators to flash over. If the feeder is of steel, and especially if the stranding is coarse, the required protection will be still more complete.

Steel conductors would probably be economical only where it is allowable to use bare cables, for the large size of steel cables compared with copper cables would greatly increase the cost of the insulating covering. The higher conductivity of steel for direct current than for alternating current makes the use of bare steel cables for d.c. feeders more economical than for a.c. lines. A steel cable has about eight times as much resistance to direct current as copper cable of the same size, and, therefore, seven times as much resistance as the copper cable of the same weight, since copper is more dense than steel. But galvanized steel cables usually cost less than one-seventh as much as copper cables per pound, and so should be more economical, other things being equal.

These statements of Mr. Dwight should command

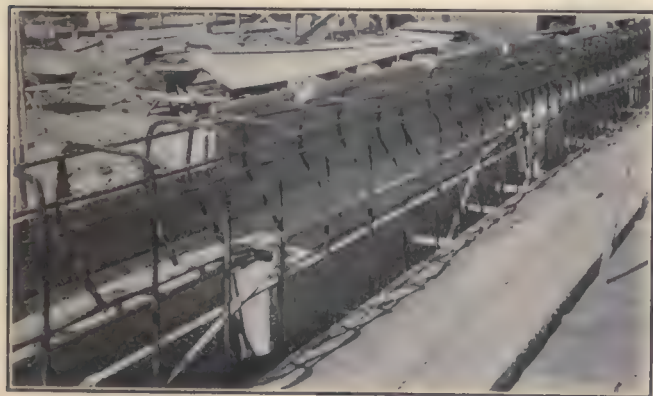


the interest of the distribution engineers on the large group of interurban railways in the Central and Western States. Most of these roads are selling energy from the railway transmission lines for distribution and use in commercial and industrial power and lighting work. With small loads a line with small conductors can be built of steel more cheaply than when minimum size copper is employed. An example is cited of a seven mile line designed for 75 k.v.a., 60 cycles, using a seven wire steel cable with a resistance of 17.6 ohms per mile at full load. The smallest copper line that could be designed would be rated at 750 k.v.a., 11,000 volts being the transmission voltage. While the poles and insulators for this line would be the same in both cases, the steel conductor would cost only \$220 against a cost of \$2,600 for copper. It is this large difference in cost which has been the main reason for using steel conductors on the branch lines of some of the big power distribution systems. This difference in cost is greatest when the price of copper is highest.

Steel cables have the added advantage of being mechanically stronger and less liable to be burned through arcs. Their useful life is much shorter than that of copper cables and their scrap value practically nothing. The price of copper cable per pound may be assumed as being ten times that of galvanized steel cable. This ratio is the usual one, being approximately true for times of low price of metals as well as for high times, and the use of steel will always increase the reliability of the transmission system.

### Installing Pit Lighting Conduit

At the Hooker Street shops of the Springfield (Mass.) Street Railway, now under construction, conduit for pit lighting service is installed in horizontal runs as shown in the accompanying illustration, alternate recesses in



HORIZONTAL RUN, SHOWING CONDUIT AND JUNCTION BOX INSTALLED FOR PIT LIGHTING

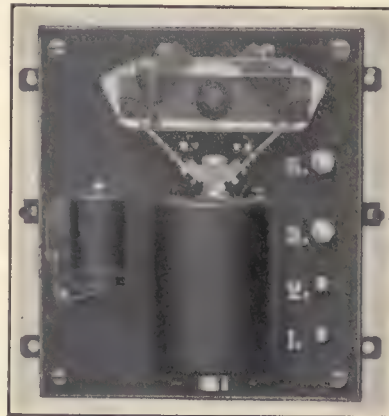
the pit walls being equipped with single and double outlets. The pit walls are about 8½ in. thick and are reinforced with ½-in. rods which are tied to the conduit pipes by iron wire at alternate vertical supports. Junction boxes located at the ends of the conduit runs are mounted at the top of wooden form boxes as shown, the concrete being poured around the rods and boxes so as to cover the junctions. The form boxes are removed after the setting of the concrete takes place, leaving the pit outlet recesses open and ready for pulling the wire. Pit recesses equipped with single outlets are 12 in. x 7½ in. x 10 in. x 5 in. in size, and these outlets are provided for drop light service by the use of flexible cords. The recesses containing two outlets each are designed to accommodate pit lamps of the fixed type, and are about double the length of the single recesses.

### A New Forced-Ventilation Electric Heater

Light Weight Heater Fits Snugly Under End Car Seat, Utilizing Space Otherwise Unoccupied

An electric heater built on the same plan as the coal-burning type of forced ventilation heater manufactured by the Peter Smith Heater Company of Detroit, Mich., has now been perfected and put on the market. The assembled standard outfit consists of a transite lined

sheet-steel cabinet containing nine heater coils, a motor resistor and heat fuses assembled between the fresh air receiving chamber and the hot air mixing chamber, and all attached to the motor-driven blower. This arrangement of the elements in the heater gives an air distribution which heats all the coils practically to the same temperature. The heat is distributed through



AUTOMATIC SWITCH WITH CASE REMOVED

the car by a duct system similar to that employed with the forced ventilation coal heaters manufactured by this company. Fresh air is taken from the outside or the inside of the car as desired, and forced over the heating elements. The standard equipment will deliver from 300 cu. ft. to 500 cu. ft. of air along the floor line. This will heat a cold car starting from depots or lay-over points in approximately ten minutes. It requires a space 13 in. high, 18 in. wide and 3 ft. long, and exclusive of the duct system weighs 138 lb.

The heating element consists of resistance wire wound on porcelain spools complete within themselves. These spools make contact automatically when slid into place between two porcelain cheeks which contain the spring connections that make the contact between the coils and the line. The spools are interchangeable, and to remove any or all of them it is only necessary to take off the heat fuse plate, requiring less effort than to replace an ordinary inclosed fuse.

The heater wire proper is a high-grade, non-corrosive alloy which has a temperature coefficient of nearly zero. Such sizes of wire are chosen that the temperature under normal operating conditions never rises above 600 deg. Fahr. Under these conditions the wire attains only 33 1/3 per cent of the allowable temperature at which it could be worked indefinitely. In order to meet the underwriters' requirements provision is made for breaking the heater circuit by heat fuses when the air supply fails. Under normal operating conditions these heat fuses carry the current for which they are intended, but will fuse and cut off the current when the



VIEW OF THERMOSTAT





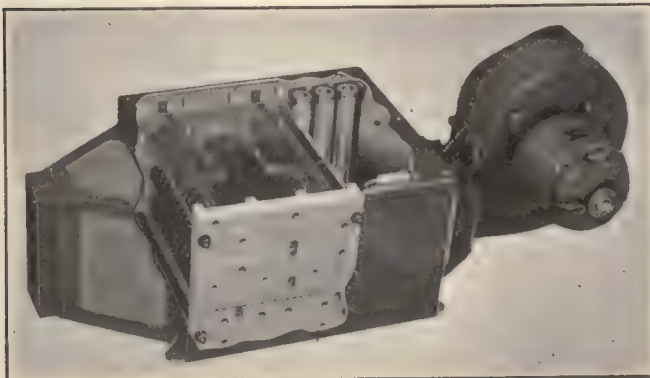
VIEW OF HEATER ASSEMBLED

draft of air is insufficient to keep the temperature below 800 deg. Fahr.

The blower used with this heating equipment is of the multivane type and the fan is built of a number of concave blades mounted like the buckets in a turbine engine. This type of blower is very efficient, as is indicated by the fact that it is but one-half the size, two-thirds the weight and delivers 20 per cent more air than its equivalent in the blade type of fan. The blower has sufficient capacity to furnish from 300 cu. ft. to 500 cu. ft. of fresh air per minute, depending upon the size of the heater and the speed of the fan. The motor which drives this fan was designed especially for this forced ventilation electric heater, and it is both light in weight and as small in size as consistent with good practice. The motor is entirely inclosed to make it dustproof, and a hinged cover is provided over the commutator to make access easy to the brushes and for inspection.

All of the heater motors are insulated to stand a 1200-volt a.c. potential test for a period of three minutes, and they require but little attention, it being necessary to inspect them about once a week during the heating season. The standard heater is equipped with a motor requiring a  $\frac{1}{2}$  amp., and the drop across the terminals is 350 volts when the speed of the motor is 2300 r.p.m.

Suitable resistance is connected in series with the motor to form a part of the control circuit and, as mentioned in the beginning of the article, this is mounted in the heater cabinet so that the heat dissipated is not lost. The standard heater outfit may be arranged for any size of car by simply changing the heating elements and the speed of the fan. The capacity of the heater ranges from 12 amp. to 36 amp., or from 7.5 kw. to 22 kw. The over-all dimensions of the standard heater equipment were so selected that it could be installed under the end car seat and utilize space otherwise unoccupied.



VIEW OF HEATER AND PARTS

The coils are arranged in two sections so that they may be controlled manually or through an automatic switch. One group of coils is of such capacity that it will raise the temperature of the ventilating air 70 deg. Fahr. above the outside air, while the total capacity of the sections will raise the temperature 145 deg. Fahr., depending upon the amount of air delivered by the blower.

The automatic control equipment includes an automatic switch and a thermostat. The switch consists of two solenoids, which close the main and auxiliary heater circuits, installed in conjunction with a small relay which is in the thermostat circuit. When the car has reached the predetermined temperature this relay short-circuits the main solenoid which, in releasing, opens the main heater circuit. Line voltage fluctuation was taken into account in the design of these solenoids and magnets as well as the whole heater apparatus. In fact, actual service experience has demonstrated that the apparatus will work satisfactorily when the drop in voltage from normal is 50 per cent, and it will not over-heat at 25 per cent rise above normal.

The thermostat used in connection with this forced draft electric heater equipment is of the mercury column contact type, but of special design. Both the difference of the potential and the current employed in the operation of the thermometer is so low that it is in no way destructive to the mercury. Regarding the special construction of this thermometer it may be said that while any thermometer with a wire contact might seem sufficient to control car heating equipment, yet the mercury column bore is accurate to  $1/10,000$  in., hence the placement of the contact wire in the mercury column and the shape of the wire at the point of contact frequently means the success or failure of the control equipment. To obviate any difficulty which might arise from these sources the thermometers in the automatic control have been very carefully manufactured, and are said to cost about five times as much as the thermometers ordinarily used in thermostatic control.

## Convenient Outdoor Metering Equipment

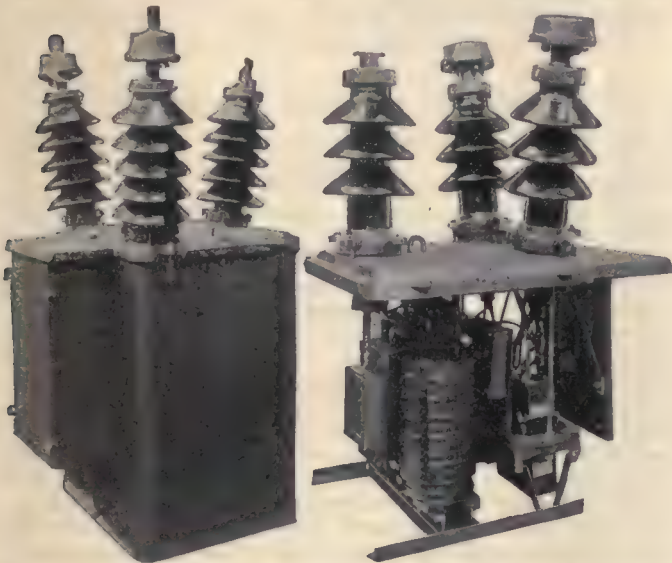
The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently placed on the market the outdoor metering equipment shown in an accompanying illustration. Each equipment consists of a standard polyphase watt-hour meter, two current transformers, a polyphase voltage transformer, and three choke coils, all inclosed in a sheet steel case with a cast-iron cover supporting three high-tension outdoor-type terminals.

This device has been developed to be used in 60-cycle polyphase service for voltage ratings from 11,000 volts upward and for current ratings not exceeding 200 amp. The sheet steel case is subdivided into two compartments, one of which is filled with oil, in which the transformers and choke coils are immersed, while the other serves to inclose the meter and meter panel. On this panel are also mounted two fuses to protect the voltage circuit of the meter and two calibrating links located in the current circuit of the meter. These calibrating links consist of fuse clips with a brass tube inserted instead of fuses. The meter may be read or checked upon opening the hinged door which covers the entire front of the meter compartment. The arrangement is such that the entire outfit, including meter panel, can be raised out of the tank without disconnecting the meter leads.



Three primary outlet terminals provide the necessary primary connections, one of the terminals serving as the common connection of the voltage transformer windings, while each of the other two terminals provide connection for one current transformer and one end of one of the voltage transformer windings.

The current transformers each have two primary windings which may be connected in series or in parallel by connecting links in the weatherproof cap at the



VIEWS OF OUTDOOR METERING EQUIPMENT WITH CASE REMOVED AND WITH CASE INCLOSED

top of the outlet terminals. The polyphase voltage transformer consists of a three-phase core having windings on the two outer legs only, and is therefore equivalent to two single-phase voltage transformers connected in open delta. Choke coils are inserted between the voltage transformer windings and the outgoing leads to protect the transformer windings against high-frequency disturbances.

Induction Relay for Selective Overload Protection

An induction-type, time-limit, overload relay which is particularly applicable to those systems where extreme accuracy in timing is required for tripping two or more air or oil circuit breakers selectively has just been placed on the market by the General Electric Company, Schenectady, N. Y.

The operating or characteristic curves for the various time-current settings are entirely separate and distinct at even the heaviest overloads and never become instantaneous. This is because of the inherent characteristics of the relay which produce a curve consisting of an inverse time portion up to approximately 2000 per cent of minimum contact closing current, blended into a definite time portion with a slight downward slope. Consequently, the relay will do the work ordinarily required of both inverse and definite time-limit relays. According to the claims of the maker the heaviest overloads do not disturb the form of the curve nor cause vibration or chattering of the moving parts.

The relay is made in single-pole elements, is circuit closing, and operates with a time delay which is inverse for the lower current values and which approaches a definite minimum for the higher current values. It is designed for use in the secondary of current transformers, the normal load rating being 5 amp. However, by means of the current tap plate, the relay may be set

TIME IN SECONDS TO TRIP														
15	1.0	1.2	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0	10.0	15.0	20.0
2	0.55	0.65	0.85	1.25	1.55	2.25	2.65	3.25	4.25	5.70	6.60	8.25	12.00	16.50
3	0.40	0.66	0.94	1.21	1.58	1.85	2.35	2.95	3.62	4.50	5.30	6.60	10.00	15.00
4	0.34	0.55	0.74	0.94	1.20	1.41	1.83	2.22	2.73	3.30	3.90	4.80	7.50	11.25
5	0.26	0.43	0.59	0.76	0.96	1.10	1.44	1.72	2.10	2.55	3.00	3.60	5.50	8.25
6	0.25	0.39	0.51	0.63	0.71	0.88	1.20	1.45	1.75	2.10	2.50	3.00	4.50	6.75
7	0.25	0.36	0.49	0.62	0.73	0.87	1.12	1.33	1.63	2.00	2.40	2.80	4.20	6.30
8	0.25	0.35	0.47	0.60	0.71	0.85	1.08	1.28	1.58	1.95	2.35	2.75	4.10	6.15
10	0.25	0.35	0.47	0.60	0.71	0.85	1.08	1.28	1.58	1.95	2.35	2.75	4.10	6.15
LEVER SETTING 1 2 3 4 5 6 7 8 9 10 LEVER SETTING														

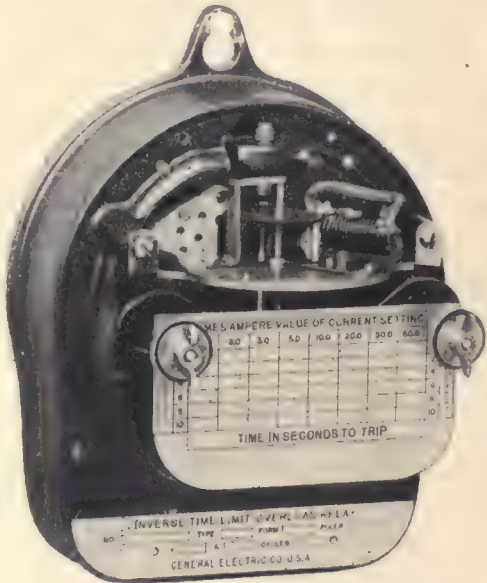
INDEX PLATE WITH TIME DELAY FIGURES

for 4, 5, 6, 8 and 10 amp., positive operation being obtained throughout this range.

The contacts are closed on overload by the rotation of a disk actuated by a "U"-shaped driving magnet with shading coils on the pole pieces. No tripping current is carried through the revolving parts. When the contacts have been closed they are firmly held in that position until tripping occurs, by the armature of a holding coil connected in series with the contacts, the trip coil of the air or oil break circuit breaker and an auxiliary switch which opens when the breaker is tripped. This insures current on the trip coil continuously until the circuit breaker opens, and prevents flashing at the relay contacts.

The values given in vertical columns 1 to 10 on the index plate are the time delays which will be obtained at the different degrees of overload, represented in the "Times Current Tap Setting" columns at the extreme right and left sides of the index plate. The factors appearing in the "Times Current Tap Setting" columns, when multiplied by the current tap setting, represent actual secondary current values.

The contacts, which are made of a special non-corrosive metal, are designed for use on direct current.



TIME LIMIT OVERLOAD RELAY WITH COVER REMOVED

They will carry 18 amp. momentarily without damage to the contact surfaces. A thermostatic device within the relay compensates for any variations in room temperature.

This relay is being furnished in two styles, one for 25-cycle and one for 60-cycle circuits. Although the principle of operation and the inherent characteristics are the same in both relays, the relays themselves differ only in slight details of construction.



## NEWS OF ELECTRIC RAILWAYS

### MINNEAPOLIS VALUATION FIGURES PRESENTED City Engineer Presents Figures in Connection with Franchise Renewal

City Engineer F. W. Cappelen, in a report to the City Council of Minneapolis, Minn., says that a "fair valuation" of the Minneapolis Street Railway is \$25,914,308. This is the physical value, the report says, together with capital invested in the development of the property and present commercial value of water power leases. It does not include value of franchise or good will. The report was ordered as a basis for franchise renewal negotiations.

Mr. Cappelen has also submitted an inventory of various items which he did not include in his valuation figures. In the valuation estimate \$21,152,221 represents cost to reproduce, less depreciation. In the secondary inventory this item, as cost to produce physical property new, without depreciation, is given as \$22,432,073. This secondary estimate also includes value of leased steam station property, valuation of the downtown terminal block owned by a subsidiary of the company, and the cost to reproduce physical property that is in the 5-cent-fare district but outside the city. The total arrived at in this secondary inventory is \$28,789,085. This is the table presented by Mr. Cappelen in his first valuation estimate:

Summary of values as of Jan. 1, 1916:	
Present value of physical property, being cost to reproduce new less depreciation, table No. 1.....	\$21,152,221
Capital invested in the development of the property, being the fair going concern value, table No. 2....	4,270,230
Total capital invested in the property.....	\$25,422,451
Present commercial value of waterpower leases to July 1, 1923.....	491,857
Fair value of the property.....	\$25,914,308

The secondary estimate contains these items:

Value of all items inventoried and valued:	
Cost to reproduce physical property new, table No. 1.....	\$22,432,073
Capital invested in the development of the property, table No. 2.....	4,270,230
Present commercial value of waterpower leases to July 1, 1923.....	491,857
Value of lease of steam property, table No. 3.....	140,000
Value of terminal block, table No. 3.....	1,300,000
Total inside city of Minneapolis.....	\$28,634,160
Cost to reproduce physical property new in 5-cent fare district outside of city, comprising the Columbia Heights and Fort Snelling lines.....	154,925
Total.....	\$28,789,085

The part of the report wherein is shown the difference between existing value as of Jan. 1, 1916, and the cost of reproduction, as of Jan. 1, 1916, follows:

Item	Cost to reproduce new	Present value
Grading .....	\$13,948	\$13,948
Track .....	4,092,658	3,732,098
Bridges .....	126,427	126,309
Paving .....	2,221,029	1,906,208
Electrical distribution system.....	2,038,675	1,965,434
Rolling stock .....	4,649,318	4,356,184
Power plant equipment .....	2,339,603	2,190,007
Substation equipment .....	549,886	549,886
Buildings .....	1,504,915	1,451,524
Furniture and fixtures.....	66,003	57,885
Stores, tools and miscellaneous equipment.....	700,368	673,497
Real estate .....	1,088,862	1,088,862
Expenditures due to municipal improvements and real estate dedicated to city.....	254,206	254,206
Administration, organization and legal expense .....	329,420	329,420
Taxes during construction period.....	325,194	325,194
Interest during construction period.....	2,131,554	2,131,554
Total .....	\$22,432,072	\$21,152,221

In commenting on the physical value estimated Mr. Cappelen in his report says:

"All prices on material, apparatus and equipment used in the valuation are the average normal market prices during the five years from 1911 to 1915 or the ten years from 1906 to 1915 as quoted by the manufacturers of each class of material, apparatus and equipment so as to eliminate

the abnormally high prices prevailing at the present time due to industrial and war conditions. For illustration, the present market price of copper wire is 100 per cent more per pound than the price used in the valuation; also the present market for high T rail is about 15 per cent more per ton than the price used in the valuation."

### NEW CARHOUSES AND SHOPS FOR LOS ANGELES

The Pacific Electric Railway, Los Angeles, Cal., has sold a considerable part of its twenty-acre tract at Seventh and Central Avenues, that city, to the Wholesale Union Terminal Company. This, added to the other land acquired, will give the Union Terminal Company approximately twenty acres on which to construct its buildings and tracks. The Pacific Electric Railway will change the location of its carhouses and tracks now occupying the ground sold. A new carhouse will be constructed in the eastern part of Los Angeles, near Echandia Junction. A similar carhouse will be constructed at Watts. The necessary land is all acquired. In the new buildings recreation rooms will be provided for employees. The cost of the new carhouses will be approximately \$120,000, to which value of real estate is to be added to represent the total investment. The shops of the Pacific Electric Railway will be removed from the location adjoining the Union Terminal property to Torrance, in accordance with arrangements made some time ago. The investment will be several hundred thousand dollars.

### TENTATIVE TOLEDO DRAFT SUBMITTED

Johnson Thurston, president of the Street Railway Commission of Toledo, Ohio, and Ralph Emery, its general counsel, presented a tentative draft of a street railway ordinance to that body on Oct. 12. They have been working on the ordinance since July 25, when the commission held its last meeting. It suggests two plans in case the city wishes to take over the property from the Community Traction Company, to which the Toledo Railways & Light Company is to sell its property other than its lighting and power equipment, in case a satisfactory agreement is reached.

One plan contemplates an outright purchase at any time the city is able to raise the money. The other provides that after five years the city may lease the property from the Community Traction Company, with a clause in the contract agreeing to buy it. This is a new idea incorporated in the plan. Under it the city would operate the lines, pay the maintenance and operating charges, together with 3 per cent semi-annually on the par value of the stock and 1 per cent semi-annually which would be applied on the purchase price. If the payments were continued the city would discharge the entire purchase price in fifty years, when the property would be taken over.

In a general way this ordinance follows the one outlined some time ago in conference with Henry L. Doherty, chairman of the board of the company, although it was not formulated in the same way at that time. It proposes to grant a franchise to the Community Traction Company, to which the property is to be transferred by the Toledo Railways & Light Company. In some respects the provisions of the grant are similar to those of the Cleveland franchise. One of the features is the establishment of an equalizing fund. This is to be accumulated from the earnings after the payment of 6 per cent dividends on the par value of the stock, allowing for cost of operation, maintenance, depreciation and renewal. After starting with an arbitrary rate of fare, the rate at the end of each six months is to be determined in accordance with the amount of money in the fund. If the sum in this fund has increased beyond a certain fixed amount, the fare will be reduced, and if it has fallen below a certain minimum the fare is to be increased.



# AGREEMENT REACHED IN DALLAS

## Conditions Announced Under Which Local Dallas Interests Will Take Over Dallas Properties

An agreement has been reached between all parties interested in the Dallas traction and electric lighting problems by which J. F. Strickland and C. W. Hobson, backed by the General Electric Company, will lease the Oak Cliff street car lines from the Northern Texas Traction Company. This is the announcement made by Mayor Henry D. Lindsley of Dallas on his return from New York and Boston, where for two weeks he had been in conference with representatives of the Stone & Webster interests and the General Electric Company.

According to Mayor Lindsley, the lease agreement permits the consolidation of all the street car lines of Dallas under one management and also gives the city the same option for purchase of these lines as is retained over the lines east of the Trinity River. The lease agreement, however, is conditioned upon two points that must be settled by the people of Dallas. The contests that have been brought in the courts against the model service-at-cost franchises, adopted in the municipal election of last April, must be disposed of so as not to invalidate these ordinances; and the straw vote that is to be taken on the proposed valuation of \$8,500,000 for the traction and lighting properties in the city of Dallas instead of the valuation of \$7,100,000 as fixed by E. W. Bemis, utility expert, must be favorable to the higher valuation. Steps will be taken at once to dispose of both of these questions in the interest of the lease agreement.

Immediately on his return from the East, Mayor Lindsley prepared a lengthy statement for the Board of City Commissioners reviewing in detail the negotiations and the results obtained in the New York and Boston conferences. This statement, which was approved by the Board of Commissioners and published for the information of the people of Dallas, is as follows:

"After weeks of effort on the part of J. F. Strickland and C. W. Hobson and their associates, a lease has been at last concluded with the Northern Texas Traction Company of the Oak Cliff street railway lines, thereby making it possible for all of the street railway lines in the city of Dallas to be operated under one franchise. This lease gives the city the same control of service and extensions in Oak Cliff as exists with the lines east of the Trinity River. It also provides that the city may buy the Oak Cliff lines on the same terms as would apply to the lines east of the Trinity River. The Oak Cliff situation presented difficulties which at times seemed insurmountable, and Messrs. Strickland and Hobson and their associates have only just been able to conclude a lease which will be approved by the city of Dallas in event the new franchise goes into effect. The people of Dallas have heretofore been advised very fully through the public press relative to the propositions made by Messrs. Strickland and Hobson for a settlement of the traction and electric lighting and power problems.

"1. The maximum rate for electric lights in the city of Dallas will, on Jan. 1, 1919, be reduced to 6 cents per kilowatt-hour, and this rate thereafter will be the permanent maximum rate for lights in the city of Dallas. This means that the maximum rate when the franchises may become effective will be 8 cents per kilowatt-hour; that on Nov. 1, 1917, the maximum rate will be 7 cents per kilowatt-hour and that on Jan. 1, 1919, and thereafter the maximum rate will be 6 cents per kilowatt-hour.

"2. One million dollars additional in cash will be guaranteed to be spent by the electric light and power company within five years from the time the franchise goes into effect; that is, the guarantee will be that \$1,000,000 will be spent within eighteen months from the date the franchise becomes effective, and an additional \$1,000,000 within the forty-two months succeeding thereafter, making a total of \$2,000,000 guaranteed to be spent on the electric light and power property alone.

"3. The basic rate of return on the valuation allowed in the electric light and power franchise will be reduced from 8 per cent per annum to 7 per cent per annum, thus making the basic rate of return on the valuations allowed in both

the electric light and power franchise and the street railway franchise 7 per cent per annum.

"4. That twenty-two tickets for a dollar will be sold by the new street railway immediately upon the franchise becoming effective, and that the maximum permanent guaranteed rate thereafter will be 5 cents cash fare and twenty-two tickets for \$1 and universal transfers.

"5. That as soon as the street railway lines can earn 8 per cent per annum they will sell six tickets for 25 cents on all street cars in Dallas.

"6. A more definite time has been determined when a second interurban will be built out of Dallas. The agreement is that the second interurban will be commenced within six months after the street railway lines east of the Trinity River equal in gross receipts per mile the receipts per mile in the year 1913, or (if this should occur sooner) when the gross receipts of the street railway lines east of the Trinity River bear the same proportion to the then investment as the gross receipts for these lines in 1913 bore to the valuation of \$4,100,000.

"The above enumerates the advantages to the people of Dallas which have been recently secured from Messrs. Strickland and Hobson and their associates in addition to those which have heretofore been stated through the public press.

"An agreement was reached on practically all points except that of valuation. Messrs. Strickland and Hobson had an option on these properties at \$8,500,000, at which price they proposed to value them in the franchises. The Board of Commissioners had valued these properties at \$7,100,000.

"It was agreed between Messrs. Strickland and Hobson and the Board of Commissioners that the issue would be submitted to the people of Dallas in order that by a postal-card vote the Board of Commissioners might be advised whether our citizens desire to approve the conclusion of franchises with Messrs. Strickland and Hobson.

Prior to the securing of the conditions just mentioned Messrs. Strickland and Hobson, as the result of negotiations with the Mayor and Commissioners since the election last April, had agreed as follows:

"(1) That two interurbans would be built into Dallas of not less than 30 miles each in length, the construction of the first to commence within six months from the time these franchises go into effect and to be completed within eighteen months thereafter. The time for the construction of the second interurban was indefinite, but has recently been made more definite, as above stated.

"(2) That the maximum rate for electricity to be charged small consumers would be 8 cents per kilowatt-hour from the time the franchises would go into effect, and this rate would be 7 cents on Nov. 1, 1917. (As a result of the recent negotiations this maximum rate would be further reduced to 6 cents per kilowatt-hour.)

"(3) That the rate for power in Dallas would be as low as 1 cent per kilowatt-hour.

"(4) That in no case would any rates for light or power now existing in Dallas be increased over present rates, so that if the new schedules of rates do not in every instance enable a reduction in the price of lights and power then, the consumer affected would have the option of retaining the rate now paid.

"(5) That the new terminal building would, at its actual cost, become the property of the new traction company, subjecting it to the control of the city of Dallas in the interest of present and future interurbans.

"(6) That the Oak Cliff street car lines would, through either purchase or lease, be placed on the same basis, and have the same advantages to the citizens of Oak Cliff and to the people of Dallas generally as would pertain to the lines east of the Trinity River.

"(7) That the street railway would expend, within eighteen months from the time the franchises went into effect, \$1,000,000 in cash on improvements and extensions of the street railway lines in the city of Dallas.

"(8) That the electric light and power company would expend the sum of \$1,000,000 in cash within eighteen months from the time the franchises went into effect in improving and extending the electric light and power system in the city of Dallas. (As a result of the recent negotiations, the



electric light and power company will contract to expend \$2,000,000.)

"(9) That the basic rate of return on the street railway valuation would be 7 per cent per annum, and that the basic rate of return on the electric light and power valuation would be 8 per cent per annum. (As the result of the recent negotiations, the basic rate of return on both of these properties will be 7 per cent per annum.)

"(10) That the 'London Sliding Scale' would be introduced into both the new franchises, permitting the owners and operators of the properties to earn a higher rate of return than the basic rate in event of corresponding reductions in rates for service to the people of Dallas.

"(11) That the holding company, organized under the laws of Maine, known as the 'Dallas Electric Company,' would be eliminated, and that these properties would be held by corporations organized under the laws of the State of Texas, and that all of their stocks and bonds would be held by many investors instead of by a holding company."

The official statement says further:

"All of these agreements Messrs. Strickland and Hobson are now prepared to carry out, and, in addition thereto, the new advantages to the people of Dallas herein specified.

"It is estimated that the two new interurbans will cost at least \$3,000,000, which, if added to the \$1,000,000 guaranteed to be expended by the street railway company and the \$2,000,000 guaranteed to be expended by the electric light and power company, will make a total of about \$6,000,000 to be expended in and immediately at Dallas.

"This would mean the withdrawal of Stone & Webster from ownership, control or management of public utilities in Dallas, and the substitution of Dallas men who would have the immediate financial backing of the General Electric Company.

"It would mean that bonds in the total sum of \$1,000,000 would be executed in favor of the city to insure the expenditure of \$3,000,000 in cash on the street railway and electric light and power properties, and for the building of the two interurbans. In addition, the franchises provide that in event said \$3,000,000 is not expended as stipulated the franchise will be forfeited."

It is now proposed by the Board of Commissioners and by Messrs. Strickland and Hobson that copies of these franchises will be shortly mailed to every voter in Dallas; also copies of the Oak Cliff lease; also copies of the contracts to build the two new interurbans; also a statement from the Board of Commissioners; also a statement from Messrs. Strickland and Hobson, and that the citizens be requested to indicate on a card to be inclosed whether they now desire to approve or disapprove the passage of the franchises by the Board of Commissioners. As a result of this postal-card vote the position of the Board of Commissioners will be determined as follows:

"(1) If the franchises are disapproved we shall consider it is not the desire of our citizens for the Board of Commissioners to pass them, and it will not do so.

"(2) If the franchises are approved by a substantial majority of those voting, then the Board of Commissioners will pass them as soon thereafter as will be legal.

"The people of Dallas will then have the opportunity to do one of two things:

"(1) By a referendum vote require that these franchises be submitted at the regular election on the first Tuesday in April, or

"(2) Permit these franchises to become law at the expiration of sixty days after their final passage by the Board of Commissioners, without a referendum vote."

The Board of Commissioners say in conclusion:

"We desire the citizens of Dallas to know that we consider the agreements which have been reached with Messrs. Strickland and Hobson and their associates to embody all of the advantages which can possibly be secured at this time in an amicable settlement of the street railway and electric lighting and power problems. The very best has been done that could be done by the representatives of the people. We leave to the people of Dallas to determine whether the work which has been done is worth while, and whether it is now their desire finally to settle these problems on the basis stated."

## SEATTLE AND TACOMA OPPOSE RAILWAY

### Puget Sound Company Seeks Relief from Burdensome Franchise Provisions

The City Council of Seattle, Wash., at a recent meeting, adopted a resolution directing Corporation Counsel Hugh M. Caldwell to join with City Attorney U. E. Harmon of Tacoma to resist the application of the Tacoma Railway & Power Company to the Public Service Commission for relief from certain of its franchise obligations. In a communication to the City Council Mr. Caldwell said that the same questions involved in the application of the Puget Sound Traction, Light & Power Company, operating in Seattle, for relief from payment of its gross earnings tax, the pavement of street areas between its tracks, one-third the cost of bridges, and similar obligations, were involved in the Tacoma case. He said that the decision in the Tacoma case would have a most important bearing on the Seattle case. Although the Seattle case has been pending for a longer period than the Tacoma case, the latter will have precedence because the Public Service Commission has made a physical valuation of the Tacoma properties.

The complaint of the Tacoma Railway & Power Company in the matter was filed with the Public Service Commission against the city of Tacoma on Oct. 4. The complaint declares that the revenue of the company is insufficient to comply with any of the provisions of the city franchise, except to render adequate and sufficient service at a fair and reasonable rate. The company lays special stress on the statement that "it is impossible to continue to operate its street railway line for a 5-cent fare throughout the limits of the city of Tacoma, to maintain the present standard of service required by the commission and demanded by the public, and continue to make the payments and contributions required from the plaintiff by the city of Tacoma. The time has arrived when the plaintiff will be forced to cease operation unless it obtains some relief."

A hearing is prayed for by the company, and the plea made that the result will be relief from fulfilling its franchise obligations. Figures compiled by the company show that on Dec. 31, 1915, exclusive of the depreciation costs of physical property, a loss of \$218,872 was sustained. It is further shown that within the last five years the company has paid \$97,224 in gross earning taxes and \$59,334 in contributions to city bridges. During the next five years, the complaint recites, the company will be called upon to pay \$175,000 for paving and \$100,000 for renewals and maintenance on paving. The gross earnings tax, it is estimated, will be between \$16,000 and \$20,000 annually. Free transportation furnished to city employees, exclusive of firemen and policemen in uniforms, is placed at approximately \$6,000 a year. Through the "gratis franchise rights" tendered the jitney bus the company has not had enough net earnings left to pay the interest on its bonded indebtedness, it is claimed.

Comptroller Shoemaker of the city of Tacoma, in speaking of the complaint, said:

"I am of the opinion that the company has a legitimate complaint in respect to the jitneys. In the franchise to the company the city pledged itself to hold certain streets and avenues exclusively for the operation of street cars without competition. It is my opinion, personally, that the city violated a part of its franchise agreement in allowing the jitney bus to compete with the street cars on streets and avenues given exclusively to the railway company for the operation of its cars. With regard to the gross earnings tax, the maintenance of streets and bridges, and the free transportation to city employees, it is a fact that the company expressed a willingness to do all these things in return for the franchise. If the company believes it has made a bad bargain that is its fault, not the city's."

The City Council has been asked by the city attorney to decide what shall be done by the city by way of reply to the complaint filed by the company. Mayor Fawcett's reply to the company's action was the sending of a letter to Pierce County candidates for the Legislature, asking their support for legislation to abolish the power of the Public Service Commission in interfering with home rule in cities of the first class.



## REPORT ON TRANSIT CONDITIONS IN PITTSBURGH

Attorney C. Elmer Bown, adviser to the Council of Pittsburgh, Pa., in traction matters, has handed in a report winding up with a recommendation that the city take its case for better transportation before the State Public Service Commission. Mr. Bown's report deals with these subjects: Service, transfers, routing, rehabilitation, the finances of the Pittsburgh Railways, the ordinances pending in Council, freight transportation by street cars and new franchises. He says that observations of the rush hour service show that the Pittsburgh Railways is violating the order of the Public Service Commission. The report says that with respect to transfers Pittsburgh is at a disadvantage. In discussing routing of cars Mr. Bown advises that the present system of looping be retained for the regular service, except in some cases where the terminal loops should be lengthened. Some through routes are recommended, and there is a recommendation that the shorter terminal loops should be used for the rush tripper service.

Regarding pending ordinances Mr. Bown advises that two ordinances be not approved. These are the one for tracks in Diamond Street and the one for connections for the belt line. The report closes thus:

"As to the policy to be followed by the city, it is recommended that the questions of service, routing and transfers be made the subject of a complaint to be filed before the Public Service Commission. Negotiations on these subjects have been carried on between the city and the company for about ten years, and the company has positively declined to agree to fix a standard of service, to establish through routes, or to increase the number of transfers issued. While the other subjects mentioned in this report are proper matters for negotiation between the city and the company, the company's attitude on these questions and its defiance of the order of the Railroad Commission indicate that nothing is to be gained by further discussion of these subjects."

At the meeting of Council at which the report from Mr. Bown was received an ordinance was introduced to authorize the Mayor to appoint a transit commissioner. The commissioner must file, soon after his appointment, a budget, showing the number of engineers, draftsmen and other staff help needed. This measure was then referred to the finance committee. The question of taking the case of the city to the Public Service Commission was referred to the public service and surveys committee of the City Council.

On Oct. 13 the City Council affirmed the ordinance for the employment of an \$8,000 transit commissioner. The ordinance carries with it an allowance for a corps of assistants for the commissioner.

## I. T. S. AGAIN SEEKS CONNECTION IN ST. LOUIS

The St. Louis Electric Railway, which is the St. Louis division of the Illinois Traction System, has renewed its effort to obtain a connection with the Terminal Railroad Association tracts at the St. Louis end of the McKinley bridge. Henry I. Green, Champaign, Ill., counsel for the Illinois Traction System, has filed with the State Public Service Commission an application for an order authorizing the connection of the tracks and apportioning the cost between the two systems. The Public Service Commission has announced that it will allow ten days for the filing of an answer by the Illinois Traction System. It is stated in the petition that the Illinois Traction System does a large business in hauling freight from Illinois and Indiana points, but has never been able to maintain adequate terminal facilities in St. Louis.

About three years ago the Illinois Traction System attempted to have a bill passed in the Municipal Assembly authorizing it to connect its tracks with those of the Terminal Association in the Hall Street yards in North St. Louis. The bill was defeated. The Terminal Association opposed the measure on the ground that it would be required to handle the Illinois Traction System freight on the St. Louis side of the river without receiving any of the arbitrary rate charged for bringing it across the McKinley bridge. The Terminal Association said that under those circumstances the service would be unremunerative. The arbitrary charge

on coal brought across the McKinley bridge is 10 cents a ton. This is only half the charge made on the terminal bridges, but it covers delivery to the end of the bridge and hauling from that point must be done by shippers.

## NEW YORK POLICE OFF STRIKE DUTY

Chief Police Inspector Max Schmittberger of New York, in an order issued on Oct. 16, reduced the number of policemen assigned to strike duty to 900. The extra men were sent back to their various precincts in the five boroughs. The 900 men remaining on strike duty have been divided by day into automobile and motorcycle squads and will work in citizen's clothes. The motorcycle men will patrol the various lines, while those in charge of the automobiles will hold themselves in readiness for any emergency. The men in plain clothes will ride on the various surface cars, elevated trains, and subway trains. No men in uniform will ride on the cars during the day, but at night a uniformed man will be assigned to every car.

At the chief inspector's office it was said that reports from the street railways showed that most of the roads were running the normal number of cars by day and increasing the number on night service. In the Bronx, it was said, the Union Railway has 150 cars in operation, the normal number, and that by the end of the week cars would be running on the old schedule night and day. Out of the normal number of 927 cars, the New York Railways on Oct. 16 had 726 running day and night. Police reports from the Borough of Queens show that car lines are giving full service by day.

A number of new hurdy-gurdies appeared in the streets of New York on Oct. 16, the operators of which appealed for funds to aid the striking carmen. The machines bore placards with the inscription: "Watch your step on Election Day. Union for Union."

On Oct. 13 F. W. Whitridge, president of the Third Avenue Railway, called the attention of the men still out on strike to the insurance standing in their names under a group contract arranged between the railway and the Travelers Insurance Company. He notified the men that if they did not return to work on or before Oct. 20 the policies would be cancelled. In concluding his statement, Mr. Whitridge said:

"You will perceive that if you desire to continue the policies on your own account you must so notify the Travelers Insurance Company and get the new terms from them. If your union, that is, the Amalgamated Association of Street & Electric Railway Employees of America, were anything more than the irresponsible humbug I have declared it to be, that association might arrange to handle the insurance for you hereafter, but I assume that it will do nothing of the sort and I do not suppose any of you can expect the company to carry this insurance for you any longer. Therefore, if you wish your families to have the benefit of this insurance you must attend to it yourselves. It would be a pity to give it up, and although you have seen fit, without any reason, to part company with me, I urge upon you for the sake of your wives and children to endeavor to take care of this insurance."

## CONTRACT AWARDED FOR CINCINNATI BORINGS

The Rapid Transit Commission of Cincinnati, Ohio, awarded a contract on Oct. 13 to A. P. Birnbaum for the borings to be made on Walnut Street for the purpose of testing the nature of the earth to be excavated in building the proposed rapid transit loop.

The conference committee of the Federated Improvement Associations held a meeting on the same day to discuss the terms of a lease to be formulated for the loop. The majority of the members seemed to favor a plan that would allow the city to share in any profits or losses that may accrue from the operation of the line by the leasing company. W. C. Culkins, executive secretary of the Chamber of Commerce, urged that any contract which is formulated be based upon a fair return on a fair valuation. Judging from remarks made by Walter A. Draper, secretary of the Cincinnati Traction Company, his company would hesitate to enter into a leasing agreement with the city if the entire risk of profit or loss must be borne by it.



### HOLYOKE ARBITRATION BOARD REACHES FINDING

The arbitration board sitting in the wages and hours of service case on the Holyoke (Mass.) Street Railway has concluded its investigation. At the final session on Oct. 12, it was announced that Chairman James E. Cotter of Boston would at once draft the report of the board for acceptance by the entire commission. The principal issue between the company and its men was on the question of wages, and whether wages should be paid on a daily or an hourly basis. The arbitration board has decided for an hourly rate, and will set any run of more than eight hours and not more than nine hours as a regular scheduled run to be paid for as such. At present the maximum pay for not more than 9.5 hours is \$2.85. The new rate to be fixed by the award for not more than nine hours and not less than eight hours is \$2.97, with extra pay for more than nine hours. The pay of those who do not at present draw the maximum rate will be increased in the same proportion over what they now receive. Carhouse and shop employees will be placed on a nine-hour basis, without reduction in pay.

At present the men receive \$2.85 for working not more than nine hours on Sundays. Under the previous agreement anything more than two hours counted as five hours on Sunday work and more than 2.5 hours was counted as a full nine hours. The formal finding of the board is expected to discuss various points of this character, some of which have already been concluded in conference between the company and the union. It was the contention of the latter that the Springfield Street Railway maximum wage of \$3.10 for a nine-hour day should be granted to Holyoke carmen, but the company's argument that conditions differ in the two cities was favorably received by the board in concluding to establish a maximum of \$2.97 a day. Mayor John J. White of Holyoke represented the men. Attorney William H. Brooks was the company's spokesman on the board.

### CONDITIONS OF HUDSON & MANHATTAN RAILROAD LABOR SETTLEMENT

The account of the labor settlement on the Hudson & Manhattan Railroad, published in the New York morning papers of Oct. 13 and in this paper last week, was erroneous in so far as it related to a recognition of the union by the company. The facts are that G. H. Sines, vice-president of the Brotherhood of Railroad Trainmen, acted as an individual for the men who had been discharged and not as a representative of the brotherhood. Mr. Fisk agreed on Mr. Sines' representations to take back the thirty-two discharged men, and the men agreed not to request the company to treat with the brotherhood on any subject before Feb. 1, 1918; and also agreed not to engage in any coercive measures among the men on behalf of the brotherhood.

George W. W. Hanger, assistant commissioner of the United States Board of Mediation and Conciliation, on Oct. 12, authorized the publication of the following agreement entered into between Mr. Fisk and Mr. Sines, representing the men:

"The Hudson & Manhattan Railroad has discharged thirty-two men for insubordination in promoting the formation of a lodge of the Brotherhood of Railroad Trainmen, in opposition to the wishes and orders of the management, which has already recognized the Hudson & Manhattan Railroad employees' organization, embracing the trainmen, towermen, stationmen and other employees in the transportation department of the road, and for attempting to enforce the recognition of the Brotherhood of Railroad Trainmen in opposition to the company's orders, and for stirring up trouble and dissension in connection therewith.

"Mr. Sines, acting on behalf of the men who have been discharged, as an individual who has been selected by said employees to represent them in this matter, and not as an official of the Brotherhood of Railroad Trainmen, has claimed that these men have not been intentionally guilty of the offense charged, and has requested that the management of the road should consider the reinstatement of the discharged men upon the following conditions:

"1. Such consideration by the company or the reinstatement of the men in question is not to be construed as a recognition of or as any promise, expressed or implied, to

recognize the Brotherhood of Railroad Trainmen at any time.

"2. The railroad company shall treat solely with the Hudson & Manhattan employees organization in respect to the wages and working conditions of trainmen, towermen, stationmen and other employees of the transportation department, excepting motormen and motor switchmen, and may enter into a contract with the proper representatives of such organization in respect to such conditions.

"3. Any men who may be reinstated, or any other men who may be members of the Brotherhood of Railroad Trainmen, are not to request the company to treat with the said Brotherhood on any subject before Feb. 1, 1918, and are not to engage in any coercion among the men on behalf of said Brotherhood.

"The railroad company agrees to reinstate the men discharged, without pay for time lost, upon the foregoing conditions."

### NEW YORK COMMISSION INDORSES FENDER

The Public Service Commission of New York, First District, has adopted a report of its committee on safety devices approving the American Safety Fender, an automatic type of equipment that was described in the *ELECTRIC RAILWAY JOURNAL* for April 10, 1915. The report, which is signed by W. C. Whitson and George F. Daggett, said that the fender had been submitted to the most drastic tests on rough pavements and with dummy figures. It was used on a large motor truck. "While the demonstration was made on a truck instead of a car," the report says, "we believe that conditions would be at least as favorable for its operation on a street car, and that its adoption on cars as well as upon buses and motor trucks would be a distinct advance in existing means for safeguarding the lives and limbs of persons who are struck or come into contact with vehicles." This is the first device of the kind to receive the indorsement of the New York Commission.

### ARBITRATORS NAMED TO CONSIDER CLEVELAND POWER BID

Mayor Harry L. Davis has indicated that he will not approve of the selection of a partisan Democrat as the city's member of the arbitration board which is to decide whether or not the Cleveland Railway shall enter into a contract with the Cleveland Electric Illuminating Company to furnish power for the street railway system to take the place of that at present furnished by the old Cedar Avenue power station of the Cleveland Railway which is to be abandoned. The Council, the majority of whose members are Democrats, is to make the selection, but its action must be approved by the Mayor.

Attorney Thomas L. Sidlo, law partner of Secretary of War Newton D. Baker, has been named by the City Council as the city's member of the board of arbitration to adjust the controversy with the Cleveland Railway over the contract. Joseph Alexander will represent the company and the two men are to select a third member of the board. Both Mr. Sidlo and Mr. Alexander were at one time employed in the Street Railway Commissioner's office during the administration of Peter Witt. Mayor Davis has not intimated what step he will take regarding the appointment.

**Muskogee Strike Settled.**—After being in progress for more than two weeks, the strike of employees of the Muskogee (Okla.) Electric Traction Company was ended Oct. 11, when a contract was signed by R. D. Long, manager of the company, and the president of the newly organized union.

**Final Report on Chicago Traction Situation Being Prepared.**—Daily meetings are being held by the Chicago Traction and Subway Commission to consider the many data it has collected for the analysis of existing conditions with a view of recommending transportation improvements. As mentioned previously in these columns, this commission is composed of William Barclay Parsons, Robert Ridgway and Bion J. Arnold. Rumors regarding the findings of this commission have appeared in the local press at different times, but they were premature. The report and recommendations are now in preparation.



**Change in Suburban Franchise.**—The Commissioners Court of Dallas County has authorized a change in the franchise granted several years ago to the Dallas (Tex.) Southwestern Traction Company canceling the provision for a 5-cent fare between Dallas and Eagle Ford. In its stead there has been inserted a provision for a 5-cent fare between Dallas and Cement City. A change also has been made to make explicit the provision for hourly service each way between 6 a. m. and 7 p. m. E. P. Turner, president of the company, presented the application for the change in the franchise, explaining that the company planned to build that portion of its proposed line from Dallas to Eagle Ford at once, and later to carry out the rest of the provisions of the franchise by constructing an extension of the line to Cleburne via Grand Prairie.

**Chicago Terminal Electrification Recommended.**—The Railway Terminal Commission, composed of John F. Wallace, Walter L. Fisher and Bion J. Arnold, has recommended the electrification of the proposed Illinois Central Railroad passenger terminal in a report to the City Council of Chicago. This recommendation was essentially embodied in the following terms: "The commission feels that the development of a terminal station on the lake front of a capacity sufficient to care for all or practically all of the roads having terminals in the territory south of Van Buren Street, between State Street and the Chicago River, will permit the working out of a plan for the adoption of electrification of the passenger traffic of the Chicago terminals, and that the electrification of the passenger terminals will be a step toward electrification of all railroad tracks within the terminal district." This recommendation of the Railway Terminal Commission was made in connection with the petition which was presented for a permit by the Illinois Central Railroad Company to build its new passenger terminal station.

**Des Moines Tax Case Decided.**—The Supreme Court of Iowa has decided that the Des Moines City Railway must pay \$44,040 assessed against the right-of-way of that company for paving on Ingersoll Avenue from Twenty-eighth to Forty-second Street. The high court, in reversing the case, said: "The judgment and order appealed from must be set aside and the cause remanded with directions to the court below to confirm the special assessments as made." The company owns a 20-ft. strip of ground in the center of Ingersoll Avenue on which a double-track line is operated. The city paved on both sides of the right-of-way, but not between the rails or between the tracks, except at the street intersections. The cost was assessed against the abutting property. The company refused to pay the assessments. In the arguments filed in the Supreme Court the company claimed that its right-of-way could not be assessed as "abutting" property, and that the city had no authority to assess the company for street improvements. The company further claimed that it was a street railway and not a railroad, therefore exempt from the liability of a railroad. Justice Weaver, in writing the opinion, says that the company owns the strip of land on which its tracks are laid, and that it is more than a mere right-of-way, "therefore assessments for street improvements is that of a holder or a mere easement."

#### PROGRAM OF ASSOCIATION MEETING

##### New England Street Railway Club

In accordance with the plans made by the new administration of the New England Street Railway Club, by which six of the regular club meetings will be in charge of the vice-presidents from the several New England States, the first fall meeting after the summer respite, to be held on Oct. 26, will be Vermont Night, in charge of W. F. Corry, vice-president from that State. Mr. Corry has secured as speaker Clarke C. Fitts, Brattleboro, Vt., a former attorney-general for the State and one of its most prominent citizens. At the present time he is counsel for the New England Power Company, which is interested in the big development of the Connecticut River at South Vernon, Vt., for power purposes. His subject will be "Transportation and White Coal." The meeting is to be held at the Hotel Brunswick, on Boylston Street, just off of Copley Square, Boston.

## Financial and Corporate

### ANNUAL REPORT

#### New York Railways

The comparative statement of income, profit and loss of the New York (N. Y.) Railways for the years ended June 30, 1915 and 1916, follows:

	1916	1915*
Gross operating revenue.....	\$13,714,531	\$13,399,767
Operating expenses .....	8,374,079	8,545,043
Net operating revenue.....	5,340,452	\$4,854,724
Taxes .....	1,038,122	1,042,859
Income from operation.....	\$4,302,330	\$3,811,865
Non-operating income .....	567,869	527,242
Gross income .....	\$4,870,199	\$4,339,107
Income deductions:		
Interest on underlying bonds, rents, etc.	\$2,707,884	\$2,747,404
Interest on New York Railways first real estate and refunding mortgage 4 per cent bonds .....	722,609	691,538
Total .....	\$3,430,493	\$3,438,942
Balance .....	\$1,439,706	\$900,165
Add:		
Surplus balance at beginning of year...	64	
Addition during the year (net).....	145,445	61,279
Net income—surplus available for interest on adjustment mortgage bonds.....	\$1,585,216	\$961,445
Interest distributed on adjustment mortgage bonds .....	1,584,946	961,381
Surplus .....	\$270	\$64

\*The figures for the year ended June 30, 1915 (as contained in the published annual report of last year) are adjusted in the foregoing to accord with changes in classification made during the year ended June 30, 1916.

The gross passenger revenue for the year was \$13,379,048, an increase of \$368,115 or 2.83 per cent. Other street railway operating revenue was \$335,483, a decrease of \$53,351 or 13.72 per cent. This is accounted for principally by a decrease in revenue from advertising and sale of power. The gross operating revenue thus produced was \$13,714,531, an increase of \$314,764 or 2.35 per cent.

Street railway operating expenses were \$8,374,079, a decrease of \$170,964 or 2 per cent. The operating ratio was 61.06 per cent, a decrease of 2.71 per cent as compared with the preceding year. There was actually expended in the maintenance of way and structures and equipment \$1,898,272, and there was set aside in reserve \$844,634, the total charge to the maintenance accounts during the year (equal to 20 per cent of the total operating revenue) amounting to \$2,742,906, an increase of \$62,953. There was expended during the year for maintenance of track and roadway, electric line, buildings, structures, etc., \$1,042,356, and for maintenance of equipment, \$855,916.

The transportation expenses were \$4,293,407, a decrease of \$51,254, while the power supply costs showed a decrease of \$93,798. There was an increase of \$42,544 in the cost of car operation, due principally to the higher scale of wages prevailing during the last six months of the year. The actual expenditures during the year for injuries to persons and property were \$1,054,651, an increase of \$125,265 as compared with the preceding year. The cost of injuries and damages, however, as charged to operating expenses was \$809,660, the difference being charged to the accumulated accident reserve account on the basis of 7 per cent of the passenger revenue. Detailed comparative figures showing the efficiency of operation are presented in the table on page 908.

There was a decrease in taxes assignable to street railway operations of \$4,737 or 0.45 per cent. The taxes during the year amounted to \$1,038,122 or 7.76 per cent of the revenue from transportation. The valuations of the special franchises for 1916 were finally fixed by the State Tax Commission at \$29,417,000, a decrease of \$5,528,000 from the similar valuations for 1915. The litigation which the company instituted in the federal courts to recover the sums which it had paid to the government as excise taxes,



on account of its various lessors, under the congressional act of 1909, were successfully concluded. Refunds aggregating \$29,234 were secured as the result of this litigation.

The non-operating income of the year amounted to \$567,869, an increase of \$40,627 or 7.71 per cent. Such increase is accounted for by additional income from dividends and interest revenues, the remainder of the items in this account representing decreases in real estate revenues and in net income from operation of local cars over the Williamsburg Bridge. The gross income for the year, viz., \$4,870,200, increased \$531,092 or 12.24 per cent over the previous year. Income deductions during the year amounted to \$3,430,493, a decrease of \$8,449. During the year there was credited to surplus as available for interest on the adjustment mortgage bonds, the sum of \$128,926, representing an adjustment of accident and damage costs of the calendar year 1912 and the first half of the calendar year 1913.

The aggregate of the tax and other obligation items, estimated in part, for the year ended June 30, 1916, is as follows:

<b>Taxes:</b>	
Gross earnings.....	\$196,257
Stipulated rents.....	41,000
Car license fees.....	57,829
Real estate.....	278,899
Special franchises.....	278,855
<b>Other obligations:</b>	
Removal of snow and ice.....	149,022
Paving.....	293,867
Rent of tracks, ferry terminals, etc.....	3,054
Williamsburg Bridge tolls.....	20,593
Track and terminal rental—Williamsburg Bridge.....	3,916
City inspectors.....	9,724
<b>Total.....</b>	<b>\$1,332,521</b>

A comparison of similar figures for the other years shows that this total is under rather than above the average. Nevertheless, that total is almost 10 per cent of the gross passenger revenue for the year. If the taxes which the company pays the State and the federal government were included the total and percentage would be much greater. Some arrangement, it is said, should be made for paving and snow removal as well as special tax burdens on a basis that will enable the operating railway companies to secure a reasonable return on the capital invested and proper compensation for services performed.

COMPARATIVE OPERATING STATISTICS FOR THE FISCAL YEARS ENDED  
JUNE 30, 1916 AND 1915

	1916	1915	Change
Total revenue from operation.....	\$13,714,531	\$13,399,767	+\$314,763
Total operating expenses....	8,374,078	8,545,042	—170,964
Per cent of operating expenses to total revenue from operation:			
Maintenance of way and structures:			
Expended.....	7.60	7.53	+0.07
Reserved.....	4.15	4.22	—0.07
Maintenance of equipment:			
Expended.....	6.24	6.82	—0.58
Reserved.....	2.01	1.43	+0.58
Operation of power plant..	6.09	6.93	—0.84
Operation of cars.....	25.22	25.49	—0.27
Injuries and damages:			
Expended.....	7.69	6.94	+0.75
Reserved.....	—1.79	0.35	—2.14
General and miscellaneous expenses.....	3.85	4.06	—0.21
<b>Total.....</b>	<b>61.06</b>	<b>63.77</b>	<b>—2.71</b>
Number of passengers carried:			
Cash fares.....	257,028,563	251,264,521	+5,764,042
Revenue transfers.....	17,752,628	15,062,586	+2,690,042
Free transfers.....	108,521,893	109,943,330	—1,421,437
<b>Total.....</b>	<b>383,303,084</b>	<b>376,270,437</b>	<b>+7,032,647</b>
Per cent of free transfer passengers to revenue passengers.....	39.49	41.28	—1.79
Average fare per passenger (cents):			
Per passenger (including transfers).....	3.490	3.458	+0.032
Per revenue passenger.....	4.869	4.885	—0.016
Operating expenses per passenger (cents):			
Per passenger (including transfers).....	2.185	2.270	—0.085
Per revenue passenger.....	3.048	3.208	—0.160
Car miles.....	34,360,986	34,891,203	—530,217

PRESIDENT LILIENTHAL INDORSES UNITED RAILROADS REORGANIZATION PLAN

In referring to the United Railroads of San Francisco reorganization plan, as proposed by the bankers' committee and reviewed in the *ELECTRIC RAILWAY JOURNAL* of Sept. 30 and Oct. 7, President Lilienthal in an article in the October issue of *The United Railroads Magazine* made a statement in part as follows:

"In the first place, the capital and debts of the company are being reduced from nearly \$92,000,000 to about \$47,000,000. The holders of the company's 4 per cent bonds are being asked to surrender these bonds and accept in place of them 25 per cent of the amount due them in bonds and 46 per cent of such amount in stock, thus sacrificing at least 29 per cent of the par of their holdings. The holders of the company's notes are asked to surrender these and accept stock in their place.

"If the plan is accepted by the stockholders, as I am sure that it will be, their generosity and their willingness to incur sacrifices will appear to be all the greater when it is remembered that, instead of drawing money out of the system, as our enemies have insinuated, they have, on the contrary, during the last ten years, provided the company with \$8,000,000 in cash, of which \$5,000,000 was provided immediately after the earthquake and fire of April, 1906, to permit the reconstruction of the road. In addition, the stockholders have offered to lend an additional \$5,200,000 now to take care of the underlying bonds, namely, \$1,800,000 of Market Street Cable Company bonds, \$400,000 of Ferries & Cliff House bonds, \$2,000,000 of Omnibus Cable bonds and \$1,000,000 of Sutter Street Railway bonds.

"None of us in the organization is responsible for the conditions that have made these great sacrifices necessary. The competition of the municipal lines and of the jitneys, constantly increasing taxes and the high cost of materials are responsible, but it is the part of courage and honesty to look a situation squarely in the face and meet it. I want to make the sacrifices to our creditors as small as possible, but I deem it a paramount duty to apply the knife when it is needed, so that the company may be placed on a sound financial basis, where it cannot be attacked for sinister purposes, where it can perform its whole duty to the public and where it can do full justice to its employees. It is with these objects in view that I am throwing my whole heart into carrying out this reorganization."

**Beaumont (Tex.) Traction Company.**—An amendment to its charter has been certified to Secretary of State McKay at Austin by the Beaumont Traction Company, increasing its capital stock from \$600,000 to \$1,000,000.

**Dominion Power & Transmission Company, Hamilton, Ont.**—At a special sitting of the Supreme Court of Ontario, at Hamilton, on Oct. 2, presided over by Justice Middleton, the hearing of evidence was commenced in the action brought by Charles William Moodie, a shareholder of the Dominion Power & Transmission Company, on behalf of himself and other shareholders of the company, against certain officers and directors of the company. Mr. Moodie contends that some of the properties were secured at excessive prices; that bonds amounting in all to \$6,850,000 were sold for inadequate consideration, and that large profits were made in this connection by the defendants. Mr. Moodie asked for damages and an injunction against the continuance of the acts of the directors, and for a receiver of the defendant company. He also wants the court to set aside an issue of \$1,000,000 of common stock which, he claims, the defendant directors received as a bonus.

**Eastern Pennsylvania Railways, Pottsville, Pa.**—The Pottsville Union Traction Company, controlled by the Eastern Pennsylvania Railways, has applied to the Pennsylvania Public Service Commission for permission to purchase the stock of the Pottsville & St. Clair Electric Railway, recently completed.

**Kanawha Traction & Electric Company, Parkersburg, W. Va.**—The Ohio Public Utilities Commission has authorized the Kanawha Traction & Electric Company to issue \$1,700,000 of 5 per cent bonds to be sold at not less than



86 per cent of par. Of the amount authorized \$1,100,000 is to be used to retire two-year notes, \$40,000 to be used for improvements in Parkersburg and \$33,000 to construct a reinforced concrete viaduct at Boaz, W. Va. The remainder of the issue will be used to retire \$150,000 of bonds of the Marietta Traction Company which mature early in 1917. The company asked originally for permission to issue \$2,000,000 of bonds.

**Louisville (Ky.) Traction Company.**—Officials and directors of the Louisville Traction Company, controlling the Louisville Railway and through it the Louisville & Interurban Railway, incorporated with \$15,000,000 of capital stock, are considering liquidation of the New Jersey corporation and operation of the system as a single Kentucky corporation. A. P. Humphrey, vice-president and general counsel of the company, in a recent statement, indicated that executives of the company were making preparations for a course of action to be determined upon in the future. The purpose of taking the step proposed would be to reduce tax payments. The new federal revenue act, effective on Jan. 1, increases the tax on corporate earnings from 1 to 2 per cent and assesses a new corporation tax on the capital. Liquidation would eliminate the New Jersey corporation tax and federal, New Jersey and Kentucky inheritance taxes would be affected in favor of the stockholders. The action, it is estimated, would save the company \$31,000 annually. The Louisville Railway is a Kentucky corporation, owning the interurban lines and is capitalized at \$7,956,500.

**Municipal Railway, San Francisco, Cal.**—The receipts of the Municipal Railway of San Francisco for September totalled \$123,766, or slightly more than \$4,000 daily, according to a statement of the bookkeeping bureau of the Board of Public Works. During August the receipts from all sources totalled \$123,026, which with operating expenses of \$81,715 left a balance of \$41,311 to be used for depreciation, payment of bonds, interest and additions to the existing system.

**Northern Electric Railway, Chico, Cal.**—A suit in equity has been filed in the Superior Court of California by Edward Bonnheim, representing stockholders of the Northern Electric Company, to prevent the reorganization committee from carrying out the recently announced plans for reorganization. A temporary restraining order was also issued to prevent the reorganization committee and the Mercantile Trust Company from foreclosing on the deeds of trust which are held by the latter, on the charge that the committee is controlled by the bankers and that it is their intention to establish first liens on the Northern Electric Railway properties for the benefit of the Northern Electric Railway stockholders. A ninety-page complaint attacking the validity of the Northern Electric Company, the parent corporation, and the \$4,000,000 bond issue was filed by Mr. Bonnheim. This complaint undertakes to show that the Northern Electric Company never legally existed because of defects in its incorporation; that its acts in California are void by reason of failure to comply with the laws of the State; that the bond issues are invalid in both Nevada and California; that failure to comply with the law invalidated the deeds of trust, and that the company does not hold first-class liens on all properties, as the plaintiffs also have liens totaling about \$2,000,000.

**Northern Ohio Electric Corporation, Akron, Ohio.**—E. W. Clark & Company, Philadelphia, Pa., and Hodenpyl, Hardy & Company, New York, N. Y., have announced a plan to organize the Northern Ohio Electric Corporation to acquire not less than 95 per cent of the common capital stock of the Northern Ohio Traction & Light Company. They are offering for subscription subject to allotment when, as and if issued, ten shares of 6 per cent preferred stock of the new company of a par value of \$100 a share and five shares of common stock without par value for \$1,000. The present offering is \$6,000,000 of stock. The Northern Ohio Electric Corporation was incorporated under the laws of New York on Oct. 19 with a capital stock of \$6,375,000. The circular of the bankers says that the company will have 60,000 shares of 6 per cent cumulative preferred stock of a par value of \$100 a share and 75,000 shares of common stock without par value. It is stated that the Northern Ohio Traction & Light Company has outstanding

\$14,075,000 of bonds and \$4,600,000 of preferred stock, but that it has no floating indebtedness other than current accounts and has approximately \$1,800,000 in cash in its treasury. The bankers say that to the extent that any stock of the Northern Ohio Traction & Light Company is not acquired the amount of the indebtedness assumed will be reduced and the cash in the treasury of the Northern Ohio Electric Corporation will be increased.

**Oxford Electric Company, Mechanic Falls, Me.**—The Oxford Electric Company, lately organized, comprises what was formerly the Mechanic Falls Electric Light Company, and the Norway & Paris Street Railway & Power Company.

**Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.**—At a recent meeting of the directors of the Tuscaloosa Railway & Utilities Company, the following officers were elected: F. S. Morris, Philadelphia, president; C. R. Carter, Birmingham, vice-president; J. L. Etheridge, Philadelphia, secretary and treasurer; D. Swann, Birmingham, assistant secretary; G. A. Daniels, Tuscaloosa, assistant treasurer; I. W. Ross, Tuscaloosa, general manager.

**Worcester (Mass.) Consolidated Street Railway.**—The Massachusetts Public Service Commission has issued a decision on the petition of the Worcester Consolidated Street Railway allowing it to issue \$10,000 of new stock and \$60,000 of bonds to be applied to the extinguishment of floating debt.

### DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent, preferred; 1½ per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Northampton (Mass.) Street Railway, 2½ per cent.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

### ELECTRIC RAILWAY MONTHLY EARNINGS

#### ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '16	\$36,528	\$25,464	\$11,064	.....	.....
1 " " '15	35,131	*22,871	12,260	.....	.....

#### BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Aug., '16	\$100,761	*\$74,951	\$25,810	\$27,700	†\$1,708
1 " " '15	91,618	*67,116	24,502	18,964	†7,680
2 " " '16	198,596	*151,303	47,293	55,531	†17,886
2 " " '15	182,862	*129,298	53,564	39,986	†19,839

#### CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Aug., '16	\$628,823	\$24,501	\$604,322	\$720	\$603,602
1 " " '15	312,737	14,568	298,169	40,833	257,336
12 " " '16	7,149,948	219,437	6,930,511	421,003	6,509,508
12 " " '15	4,051,578	155,846	3,895,732	490,000	3,405,732

#### NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., Aug., '16	\$40,814	*\$28,078	\$12,736	\$7,987	†\$4,811
1 " " '15	46,258	*29,937	16,321	8,000	†8,390
2 " " '16	85,745	*53,742	27,003	15,974	†11,137
2 " " '15	96,041	*60,738	35,303	16,000	†19,443

#### NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

1m., Aug., '16	\$473,434	\$291,304	\$182,130	\$47,995	\$134,135
1 " " '15	360,054	214,559	145,495	53,318	92,177
8 " " '16	3,334,077	2,011,571	1,322,506	403,001	919,505
8 " " '15	2,488,442	1,535,909	952,533	413,588	538,945

#### PACIFIC GAS & ELECTRIC COMPANY, SACRAMENTO, CAL.

1m., Aug., '16	\$1,462,480	*\$912,643	\$549,837	\$337,198	†\$244,558
1 " " '15	1,478,867	*898,304	580,563	340,579	†257,180
12 " " '16	18,593,438	*10,764,139	7,829,299	4,069,017	†4,247,832
12 " " '15	17,989,092	*10,324,560	7,664,532	4,292,759	†3,716,732

#### PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Sept., '16	\$2,226,059	\$1,210,784	\$1,015,275	\$814,411	\$200,864
1 " " '15	2,009,979	1,115,491	894,488	815,611	78,877
3 " " '16	6,590,825	3,655,733	2,935,092	2,444,689	490,403
3 " " '15	5,847,648	3,297,930	2,549,718	2,448,149	101,569

\*Includes taxes. †Deficit. ‡Includes non-operating income.



## Traffic and Transportation

### HANDLING WORLD SERIES TRAFFIC AT BOSTON

One Hundred and Ninety Cars an Hour Were Operated to the Field Through the Boylston Street Subway at the Height of the Outward Rush

The Boston (Mass.) Elevated Railway handled the heavy extra traffic resulting from the two opening games of the World Series at Braves Field, Allston, without a single accident to passengers or employees. A few days before the games began a conference was held in the office of Edward Dana, superintendent of traffic, at which the detailed arrangements for extra service were prepared with a typewritten outline of the headway planned on the more important lines, the provisions for supplying extra cars, co-operation of different operating divisions and storage facilities for rolling stock during the game itself.

On Oct. 7, the day of the first game, a high-frequency service was inaugurated at 8 a. m. by two-car, motor-trailer trains between the North Station and Braves Field. Between Dudley Street and the latter point at the same time a five-minute service was inaugurated by 25-ft. articulated cars. At 9:30 a. m., the headway on the North Station-Braves Field line was reduced to two minutes, this schedule being maintained until noon, when it was cut to one minute and remained at this figure until the game began at 2 p. m. The Dudley Street service was increased to a three-minute headway from 9 a. m. to 10:30 a. m., and a two-minute headway was maintained until 2 p. m. From 8 a. m. until 2 p. m. trailers were added to the regular four-minute service over the Watertown-Park Street line, and to the six-minute services from Lake Street to Park Street and from Union Square to Park Street. This increase of service provided for through car movements from important subway and elevated transfer stations and certain outlying terminals of the system directly to the ball park, with the result that little congestion occurred on the loading platforms. About 190 cars an hour were operated to the field through the Boylston Street subway at the height of the outward rush, providing a total seating capacity of nearly 20,000 an hour from the down-town district via the underground lines.

The arrangements for supplying cars immediately after the close of the game were highly satisfactory. As described in the *ELECTRIC RAILWAY JOURNAL* at the opening of Braves Field last year, a prepayment area with trackage facilities for holding twelve two-car trains for immediate use is a prominent feature of the park arrangements. Arriving trains were operated around a loop from Commonwealth Avenue into the prepayment area until the full capacity of the two parallel tracks within had been attained, all passengers being discharged outside the area. Two temporary cross-overs were installed on Commonwealth Avenue between Brighton Avenue and Harvard Street, and a section of the double-tracked line located in the reservation on this avenue was operated as single track, regular cars being flagged through. This released track for the storage of eight trains and five articulated cars within two minutes' run of the park, allowing for stops in loading traffic. Ten trains and three articulated cars were stored on a corresponding temporary single-track section on Brighton Avenue, equally convenient to the grounds; eight trains were stored during the game at Watertown carhouse, ten at Oak Square carhouse, and twelve articulated cars were side-tracked at Allston carhouse.

Prompt work by inspectors at the telephones enabled these cars to be started for the park as soon as the last man was declared out, and in time to load the homeward-bound "fans." As fast as the trains stored on the two tracks of the prepayment area at the field were loaded, additional trains were routed into the area, the average loading period being approximately 1.5 minutes per train. Other extra cars and trains were loaded on the main line tracks outside the grounds.

Twenty minutes after the game the rush was virtually over in the vicinity of the grounds, the total attendance being about 40,000. In the half-hour following the game fifty-six trains and fifteen articulated cars passed through the prepayment area. Many hundreds of private automobiles were parked near the grounds and the police co-operated effectively in handling the street railway traffic. Extra employees of the department of maintenance of way, emergency linemen, inspectors and switchmen manned important points on the main lines to the field.

In speaking of the service the *Boston Globe* stated that "the trolley car arrangements were well-nigh perfect."

### COUNCIL PUTS OFF ACTION ON BUFFALO FARES

Little Inclination Manifested to Enter Into Action of Extremely Doubtful Outcome

Action on the recommendation of the corporation counsel of Buffalo, N. Y., urging the City Council to start a proceeding for a reduction in the fare charged by the International Railway from 5 cents to 4 cents within the city, has been postponed until Nov. 9 by a vote of four to one. There appears to be little inclination on the part of four of the five members of the Council to approve the recommendation in view of the situations which prevailed in Cleveland and Detroit during the rate proceedings. Mayor Louis P. Fuhrmann at the last hearing before the Council, asked the corporation counsel for statistics to substantiate his charges of alleged excessive earnings and dividends by the company. The Mayor said:

"You ask for a reduction in fare of 20 per cent, or from 5 cents to 4 cents. The receipts of the International Railway were \$6,000,000 last year. You now ask for a reduction of one-fifth that sum or \$1,200,000. Have you any figures to show that that is a proper reduction?"

Other members of the Council recalled the so-called Milburn agreement made in 1892 when there were three companies operating in Buffalo—the Buffalo Railway, the Buffalo East Side Railway and the Crosstown Street Railway. This agreement provided for a 5-cent fare with interchange of transfers. It has been ratified by the State Legislature and its provisions are recognized in the public service commission law.

Thomas Penney, vice-president and general counsel for the railway, who has appeared at all hearings, brands the proposal of the city's law department as a mere reprisal against the company because of the latter's civil action to have its alleged exorbitant special franchise assessment reviewed in the courts.

There has been much division of opinion expressed by Buffalo newspapers over the proposed investigation advocated by the corporation counsel in an effort to force the railway to lower its Buffalo city fares. The *Times*, in a recent editorial opposing the investigation, said:

"There ought to be a very thorough understanding of the terms and conditions of the Milburn agreement before the Council becomes too far involved in any litigation with the local public utility corporations. The Milburn agreement has stood since 1892; was ratified by the Legislature, and its provisions are recognized in the public service law of the State. It is all very well to say that it will not be construed to be involved in any of the proposed proceedings, but it is equally possible that able corporation lawyers will involve it because of the closeness of the question, just as they will bring about other very severe entanglements. It would seem to be the part of wisdom for the Council thoroughly to dissect the agreement in the interim during which some of these questions are to be held in abeyance. If the city starts baiting these local corporations it may necessarily mean a battle with all of them all along the line, and the officials should be thoroughly fortified.

"In these battles in Cleveland under Tom Johnson and in Detroit under Mayor Thompson, the first of which was successful and the latter not so much so, the cities were forced to the expenditure of many millions of dollars. Tom Johnson lost his own great fortune, and Detroit was in a municipal riot of one sort or another for upwards of four years. If the city enters into a battle with its public utility corporations, it must go in prepared to fight it out on that line if it takes a decade."



**SUBURBAN FARE INCREASE ALLOWED****New Jersey Commission Grants Request for Increase from 15 to 20 Cents Between Trenton and Princeton**

The State Public Utilities Commission of New Jersey has made an order permitting the New Jersey & Pennsylvania Traction Company to increase the rate of fare on its division between Trenton and Princeton from 15 cents to 20 cents, and has dismissed an application by the company for authority to transfer 10,000 shares of capital stock to the Pennsylvania-New Jersey Power & Light Company.

In granting permission to the company to increase its fare to Princeton, the board pointed out that the company's property was worth approximately \$575,000. The net profit for the last three years had averaged about \$18,000 a year, or a little more than half what the board regarded as a fair return on the investment. The company is still required, however, to sell tickets at the rate of twelve for \$1. The board allowed a 5-cent fare to be charged in each of these zones—Trenton to Sand Pit, Sand Pit to Lawrenceville, Lawrenceville to Provinceline, Provinceline to Princeton. The board said that in its opinion the application of the fares mentioned going in either direction between any point in Princeton and the town of Lawrenceville and between any point in Lawrenceville and any point in Trenton should not exceed 10 cents.

The commission, in its report, says that the experience of the company for two years operating the division at a 15-cent fare "demonstrates that the company is still earning less than the return to which the board determined it was entitled in 1913," when the rate was established. The board found in 1913 that the 10-cent rate between Trenton and Princeton was insufficient and fixed the fare at 15 cents for an experimental period of twelve months. That rate was made permanent.

The evidence submitted at a recent hearing, the report says, shows that the net income of the company for the year 1913, after paying taxes, was \$18,794; for 1914, \$15,451; and for 1915, \$17,637. The company, it appears, lengthened its time of running in order to lessen expenses, but even this, the board says, did not change the situation very much:

Continuing the board says:

"The counsel for Trenton frankly admits that the petitioner is not securing a fair and reasonable return. It is objected, however, to an increase of the rate of fare that a competing line charges a fare of 15 cents between Trenton and Princeton and that this petitioner should not be permitted to charge a higher rate than its competitor. This objection ordinarily is an important one, but it must give way when proof of insufficiency of revenue to yield a fair return on its property is adduced by the applicant, and the rate it is proposed to establish does not appear to impose excessive charges for the service afforded.

"It should be noted in this connection that since 1913 substantial improvements have been made in the company's property. New cars of enlarged capacity have been put in operation and the track has been bettered materially. Operating for the greater part of the distance between Trenton and Princeton on private right-of-way the company is able to afford and appears to provide an interurban service, in which large and heavy cars are operated at comparatively high speed. This involves a heavier capital expenditure and a greater expense for maintenance than would be the case where lighter rolling stock is operated at a slower speed. The speedy operation of the new equipment is a detail of the service advantageous to the public and must receive due credit in considering the question of the reasonableness of the company's charges."

The board says that it has adopted the policy recognized by all public utility commissions in the United States that competition between utilities is not to be encouraged because of the inevitable ultimate double burden which must be assumed by the public in the maintenance of the dual system of utilities. The report further says:

"Undoubtedly the existence of a utility in any territory which furnishes satisfactory service is sufficient ground for refusing permission to another utility to enter the same territory. But the policy referred to is of recent origin and the construction of the petitioner's line in the territory served by another line took place at a time when it was the policy

of the State to encourage and promote competition in the utility field as well as in all other fields of industry. To deny the company a reasonable return because the State has changed its policy would be an exhibition of bad faith toward the petitioner and an injustice as well."

In its refusal to allow a transfer of the company's capital stock the board says:

"In view of the fact that the New Jersey company in 1913, without the approval of this board, sold to the Bucks County syndicate, the owners of both the New Jersey and the Pennsylvania properties, or some of them now owned by the Pennsylvania company, for \$439,445 less than the book value thereof, without a reduction of capitalization or securing permission to set up a property abandoned account, the matter of capitalization and transfer of stock becomes vital.

... Whether the board will give its approval to a transfer of stock, the only purpose of which is to secure its control by a holding company, which will indirectly be a burden on the New Jersey company, is not now decided."

The board says it wants to be satisfied that the transfer intended will not so intermingle the management and liabilities of the two companies as to make separate operation and supervision practically impossible.

**ONE-MAN CAR APPROVED FOR BAY STATE STREET RAILWAY**

The Public Service Commission of Massachusetts has issued an order approving the use by the Bay State Street Railway of a type of one-man car closely resembling the Birney design described in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1916, page 556. The car is to be equipped with double-end control and is 27 ft. 9½ in. long over bumpers. The platform length will be 4 ft. 6 in. and the steps will be of the folding type. Fourteen double cross seats will be provided and the sand box on each platform can be used as a seat. A revolving seat with back is provided on each platform for the use of the motorman. A 26-in. opening will connect the platform and the car interior proper, pipe stanchions being used instead of a bulkhead. A fare box stand will be located slightly to one side of the platform center line, and the car will probably be equipped with 24-in. wheels.

**BOSTON TRANSFER HEARING STARTED**

The Public Service Commission of Massachusetts gave a hearing on Oct. 6 upon the petition of T. P. King and other patrons of the Boston Elevated Railway for increased transfer facilities at Dewey Square, Boston, in connection with surface lines to and from South Boston. H. B. Potter, assistant to the president, appeared for the company. The petitioners represented a growing manufacturing district and objected to the present limitations placed upon transfers between Summer Street extension cars and various lines passing the South Station.

Mr. Potter emphasized the existing transfer abuses on the system and called attention to the investigation of the company's financial condition now in progress by a special legislative commission, pointing out that some solution of the general transfer problem is necessary. The company maintains that it cannot afford to increase existing transfer facilities at Dewey Square pending the opening of the Summer Street section of the Dorchester tunnel from Washington station to Dewey Square.

In closing the hearing, Chairman McLeod said that the difficulties of dealing with the general transfer situation at Boston along broad lines were great, and that in the main the work of the commission must be associated with the study of specific cases and action thereon. He said:

"It seems to me that the commission is bound to recognize the condition created by the establishment and construction of rapid transit lines, and if the system is to be utilized by the public to its maximum efficiency we cannot expect that after the rapid transit line is built the whole service is going to be duplicated by surface lines. That means bankruptcy to the company—the establishment of a rapid transit line over certain territory must inevitably mean some reduction in surface car facilities if the company is to remain in a proper financial condition to furnish the service the public has the right to expect."



**Key Route Issues Bi-Monthly Publication.**—The first issue of *Key System News*, published by the San Francisco-Oakland Terminal Railways, Oakland, Cal., has recently made its appearance. Its aim is "to establish a closer understanding between the management, the employees and the patrons of the Key System," and to act as a "clearing house of information and ideas on transportation needs and problems." The paper is issued the first and fourth Saturdays of the month.

**Railway Protests Bus Service.**—The International Railway, Buffalo, N. Y., has filed a complaint with the Public Service Commission for the Second District of New York, against automobile owners who are operating a 10-cent motor bus line along the River road from the city line to the Grand Island ferry in competition with the company's stub service car. The Buffalo General Electric Company's new \$2,000,000 electric generating plant is being built just north of the city line on the River road and hundreds of employees have been patronizing the motor bus.

**"Traveling Conductor" to Study Troubles.**—The San Francisco-Oakland Terminal Railways, Oakland, Cal., has appointed one of its trusted employees to the newly-created position of "traveling conductor." It is his duty to travel continuously on the various lines and act as a sort of buffer for alleged complaints from patrons and to assist in any other way possible in increasing efficiency of the platform men and the service generally. He travels in uniform and his title appears on his cap. As the plan has been in effect only a very short time, results cannot be reported at this time.

**New Jitney Measure in Effect in Houston.**—The new jitney ordinance, requiring an annual license fee of \$72 and imposing numerous restrictions as to routes, painted signs on cars, number of passengers, etc., is now in force in Houston, Tex. Only 117 licenses have been issued under the new ordinance, whereas there were more than 500 cars in operation a short time ago. One of the greatest hardships imposed, according to the jitney men, is requiring the cars on the Houston Heights line, which operates from Houston to Houston Heights, either to take out a city license, paying the fee of \$72, or to carry only inter-city passengers from a fixed stand in Houston to a fixed stand in Houston Heights.

**Additional Testimony Presented in Fare Case.**—Additional testimony has been taken by the Board of Public Utility Commissioners of New Jersey in the protest that was filed several weeks ago against the proposal of the Burlington County Transit Company to increase fares on its lines between Mount Holly and Moorestown. The company asked the commission for authority to increase its Mount Holly-Moorestown fare from 15 cents to 20 cents. Some time ago the company was allowed to increase the fare providing it operated additional cars and gave through service. It is alleged that while the company is charging the increased fare, it has not given additional and improved service. Some residents along the line claim that the company, following a serious fire in the carhouse some time ago, purchased second-hand cars and is operating these under the increased fare. The board will announce its decision later.

**Writ of Error Denied in Fort Worth Jitney Case.**—Application for a writ of error in the case of the Auto Transit Company, *et al.*, versus the city of Fort Worth, Tex., involving the validity of the jitney regulations was refused by the Supreme Court of Texas on Oct. 4. This case originated in the Sixty-seventh District Court of Tarrant County when a petition was filed asking that the city commissioners of Fort Worth be restrained from enforcing the ordinance. A temporary injunction was granted on June 21, 1916, but a permanent injunction was refused after the hearing a few days later. The ordinance was attacked by the jitney men on the grounds that the city had no authority to enact such an ordinance and that the provision of the ordinance requiring an indemnity bond was discriminatory. No written opinion was rendered by the Supreme Court. The case was disposed of by Chief Justice Nelson Phillips and Associate Justice Yantis. Assistant Justice Mawkins did not assent or dissent in the decision, but stated that he would file an opinion in connection with the matter at a later date.

## Personal Mention

V. Everit Macy has been elected president of the National Civic Federation by the executive council, to fill the vacancy caused by the death of Seth Low.

B. W. Lynch, formerly assistant general auditor of H. M. Byllesby & Company, Chicago, Ill., has been promoted to the position of general auditor of H. M. Byllesby & Company.

I. W. Ross, formerly connected with the Birmingham-Ensley & Bessemer Railroad, Birmingham, Ala., has been appointed general manager of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., to succeed C. R. Carter, resigned, as noted elsewhere in this column.

G. R. G. Conway, formerly chief engineer and assistant general manager, and now consulting engineer for the British Columbia Electric Railway, Vancouver, B. C., has left for Mexico City, to represent the bondholders' committees of the Mexican Light & Power Company and the Mexico Tramways.

D. H. Robinson, who on June 1 was appointed overhead superintendent of the Ogden, Logan & Idaho Railway, Ogden, Utah, has been made roadmaster and is filling both positions. Prior to June 1 Mr. Robinson was superintendent of overhead lines of the British Columbia Electric Railway, Vancouver, B. C.

C. R. Carter has resigned as treasurer and general manager of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., as most of his time in the future will be taken up in the bond department of Morris Brothers Company, Philadelphia, owners of the property. He continues with the company, however, as vice-president.

William V. Brumby, formerly of the editorial staff of the *St. Louis Republic*, has been appointed editor of the *United Railways Bulletin*, published by the United Railways, St. Louis, Mo., in the interest of its employees. Mr. Brumby succeeds Pope Y. White, who has become connected with the *St. Louis Star*, as noted elsewhere in this column.

Pope Y. White, who has been connected with the United Railways, St. Louis, Mo., for two years as editor of the *United Railways Bulletin*, has resigned from the company to become connected with the *St. Louis Star* in an editorial capacity. Mr. White established the *Bulletin* for the company. Before becoming connected with the railway he was city editor of the *St. Louis Times*. He was engaged in daily newspaper work for fourteen years, advancing from reporter to city editor.

Mason D. Pratt, for nearly four years chief engineer of the United Railways & Electric Company, Baltimore, Md., has severed his connection with that company to resume private practice as consulting and constructing engineer. Mr. Pratt was for many years, during the development of the modern electric railway track, connected with the Lorain and the Pennsylvania Steel Companies. From 1904 to 1913 as consulting engineer in Harrisburg, Pa., he was identified with the rehabilitation work of the Harrisburg Railways, for which company he designed and built the first reinforced concrete carhouses and repair shops so constructed in the United States, as well as a modern power plant which holds a record for continuous, reliable and economical operation. In addition to these, his work included the construction of numerous buildings, bridges, industrial plants, water works, etc. Mr. Pratt will make his headquarters at Roland Park, Md.

Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, was the guest at a dinner at the Harvard Club in New York, given by about 100 friends in honor of his seventieth birthday, which was Sept. 16, 1916. Most of the diners were from the staff of the Public Service Commission, but there were many engineers not connected with the commission, other old friends of Mr. Craven. Among them was William Barclay Parsons, consulting engineer for the Interborough Rapid Transit Company and former chief engineer of the



old Rapid Transit Commission. Mr. Parsons was the man who built the first subway and Alfred Craven was a division engineer under him. Others from outside the commission who came to do honor to the chief were William R. Wilcox, former chairman, and George V. S. Williams, former member of the Public Service Commission for the First District. Mr. Parsons presented to the guest of the evening a magnificent silver service with the compliments of all those assembled. In the place of speeches, the dinner committee provided vocal and instrumental music.

C. W. Squier has resigned as assistant engineer for the New York Municipal Railway, Brooklyn, N. Y., to accept the appointment of assistant electrical engineer with the Public Service Commission for the First District of New York. Mr. Squier was graduated from the University of Michigan with the degree of bachelor of science in electrical engineering in 1898. Since then he has been engaged in electric railway engineering. For four years he was with the General Electric Company as designer of control apparatus, later becoming head designer of multiple-unit train control for the company. He was also connected with the Sprague Electric Company as designing engineer at the time that this company was the pioneer in multiple-unit control apparatus. In 1904 he went to England as electrical engineer on railway apparatus for the British Westinghouse Electric & Manufacturing Company, and while there designed that company's type "T" line of railway controllers, which has since remained standard for tramway work. Mr. Squier returned to the Pittsburgh works of the Westinghouse Company at the time the first New Haven single-phase locomotive was introduced. He followed the testing and equipping of these locomotives as engineer. In 1908 he became engineer for the mechanical department of the Brooklyn Rapid Transit System and since that time has been engaged in operating engineering work for the company and the New York Municipal Railway, which is included in the Brooklyn Rapid Transit System. Mr. Squier has contributed many articles on railway subjects to the *ELECTRIC RAILWAY JOURNAL*, among them a series, "Equipment Defects," which attracted special attention.

#### OBITUARY

W. T. Woodroffe, who was connected with the British Columbia Electric Railway, Vancouver, B. C., from 1908 to 1912, was killed in action in France while serving with the Canadian forces, according to recent dispatches. After he resigned from the British Columbia Electric Railway, Mr. Woodroffe became city electrician of Vancouver and later superintendent of the municipal railway at Edmonton. Shortly after war was declared he joined the Fifty-fifth Battalion of Edmonton. Two weeks after arriving in England he was transferred to the Victoria Rifles of Montreal. Mr. Woodroffe was born in England. He took up his residence in British Columbia when a young man.

Virgil Gay Bogue, formerly consulting engineer of the Department of Public Works of New York City, died suddenly on Oct. 14 on the Ward Line steamship *Esperanza* on which he was returning from Mexico. Mr. Bogue was born in Norfolk, N. Y., more than seventy-one years ago, and was graduated from Rensselaer Polytechnic Institute at Troy, N. Y., in 1868 with the degree of C. E. Mr. Bogue managed much important work during his long career. He made the examination and report on the cost of reproducing the lines of the Southern Pacific in Oregon; he prepared the plans of the tidelands and the waterfront improvements of Seattle, Wash.; he was a member of the commission appointed by President Harrison to investigate and report on methods of improving the navigation of the Columbia River at The Dalles and Celilo Rapids; he made the examination and report on the cost of revisions and improvements of the Tehuantepec National Railway of Mexico and its port facilities and the comparison of its improved route with the route of the Panama Railway. In addition to being the consulting engineer of the Department of Public Works in New York, Mr. Bogue was a member of the committee appointed by Mayor Strong to determine the feasibility of operating surface cars on the Brooklyn Bridge. He was one of the commission appointed by the president of the Long Island Railroad to report on the feasibility and cost of a tunnel beneath the East River.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

#### RECENT INCORPORATIONS

\***Knoxville (Tenn.) Interurban Railway.**—Application for a charter has been made by the Knoxville Interurban Railway to construct a line from Vestal, south of Knoxville, to Marysville, about 13 miles. Capital stock, \$10,000. Incorporators: M. T. DeVault, Norman B. Morrell, E. R. Oates, John H. Knox and John W. Hudson.

\***Hopewell & City Point Railway, Hopewell, Va.**—Incorporated to construct a line about 2½ miles long. Capital stock, minimum, \$10,000; maximum, \$50,000. Officers: James C. Rees, Jr., president, and T. Tyler Ellis, secretary and treasurer, both of Petersburg.

#### FRANCHISES

**Cleveland, Ohio.**—The Cleveland, Southwestern & Columbus Railway brought suit in the Common Pleas Court at Cleveland on Oct. 13, to compel the County Commissioners to grant it a franchise to cross certain county highways in building its track around Berea. The Commissioners some time ago refused a franchise without certain grade-crossing eliminations.

**San Angelo, Tex.**—The Interstate Electric Corporation of New York will operate the electric traction lines in San Angelo under the proposed franchise recently submitted by the city authorities, if the taxpayers of the city approve that franchise in a referendum election. Acceptance of the franchise will mean the immediate expenditure of \$125,000 in improvements and betterments to the present street car lines in San Angelo.

**Steilacoom, Wash.**—The Pacific Traction Company, a subsidiary of the Puget Sound Traction, Light & Power Company, has received a franchise from the City Council to construct, maintain and operate a single or double-track street railway on the following route: on Steilacoom Boulevard, between the town limits of Steilacoom and Starling Street; thence along Starling Street to and into Steilacoom Street; then along Steilacoom Street to and into Union Avenue; thence along Union Avenue, to the intersection of Union Avenue and Lafayette Street; also, consenting to the abandonment of operation of the present line of the Tacoma Railway & Power Company on Lafayette Street, between Wilkes Street and the town limits of Steilacoom, and to the removal of tracks and appurtenances from Lafayette Street, between Wilkes Street and the northerly town limits of Steilacoom. This franchise shall not be considered or construed as an exclusive franchise, the town of Steilacoom reserving the right to grant similar rights and privileges to other persons and incorporations.

#### TRACK AND ROADWAY

**Edmonton (Alta.) Radial Railway.**—It is reported that the city of Edmonton plans to spend about \$75,000 for extending its street-railway lines.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—It is reported that this company will construct an extension on San Pablo Avenue from Grand Canyon Park up San Pablo Canyon to the new dam of the Peoples Water Company, about 6 miles.

\***Havana, Cuba.**—A presidential decree has been granted for the construction and operation of an electric railway between Matanzas and Havana. This road will be about 60 miles long. It is understood that the road will operate at first with steam power and that electrification will be begun in 1917. The concession is held by the Hershey Corporation, a Delaware corporation whose president is Milton W. Hershey. Address Mercaderes 36, Havana.

**St. Louis-East Side Belt Terminal Railway, East St. Louis, Ill.**—Application has been made by the St. Louis-



East Side Belt Terminal Railway to the Board of Public Service of St. Louis to use the free bridge when it is completed. It is stated that the company plans to take over the holdings of the Southern Traction Company and operate an electric line from Belleville and other Illinois cities to St. Louis. [July 29, '16.]

**Southern Illinois & St. Louis Railway, Harrisburg, Ill.**—It is reported that work will be begun in the early part of November by the Southern Illinois & St. Louis Railway on its proposed line from Marion through Harrisburg, Herrin, Benton and West Frankfort to Johnson City. It is estimated that the line will cost about \$3,000,000. W. H. Schott, Chicago, president. [April 1, '16.]

**Kankakee & Urbana Traction Company, Urbana, Ill.**—Work will be begun in the spring by the Kankakee & Urbana Traction Company on the construction of an extension from Paxton to Kankakee, and work of securing the right-of-way will be begun as soon as complete plans are made.

**Terre Haute (Ind.), Indianapolis & Eastern Traction Company.**—It is reported that the Terre Haute, Indianapolis & Eastern Traction Company will spend \$45,000 in raising its tracks 7 in. from Richmond to Indianapolis.

**Manhattan City & Interurban Railway, Manhattan, Kan.**—This company reports that it is in the market for a second-hand deck girder bridge about 60 ft. long.

**Cumberland Traction Company, Edmonton, Ky.**—A number of citizens of Metcalf County, Ky., have purchased the property of the Cumberland Traction Company, which was in the hands of Master Commissioner A. J. Thompson, and will endeavor to sell it to some company which will complete it. About \$75,000 had been spent and 2 miles of track have been graded on the proposed line between Edmonton and Horse Cave. [Oct. 30, 1915.]

**Detroit (Mich.) United Railway.**—Operation was begun Oct. 15 on the Kercheval Avenue extension, which includes tracks on Kercheval Avenue from St. Jean to Hart, on Hart to Jefferson and on Lycaste, from Jefferson to Kercheval Avenues. The construction of this extension makes a direct connection between the Sherman and Jefferson Avenue lines.

**Michigan Railway, Kalamazoo, Mich.**—This company will reconstruct its tracks on South Washington Street from the tracks of the Grand Trunk Railway to Ridge Street.

**\*Biloxi, Miss.**—Plans are being made by the Biloxi Vegetable and Fruit Growers Association for the construction of a line from Biloxi to Ocean Springs, 8 miles. W. A. Reno, president.

**Omaha & Council Bluffs Street Railway, Omaha, Neb.**—This company plans to construct an extension from Twenty-fourth and O Streets to Nineteenth and W Streets.

**Morris County Traction Company, Morristown, N. J.**—A report from this company states that it has placed a contract for one mile of 7-in. T-rail to be used in the construction of second track from Maplewood to Millburn.

**International Railway, Buffalo, N. Y.**—This company has been granted permission by the City Council to lay electric conduits in Twenty-fourth Street from Allen to Buffalo Avenue, Niagara Falls.

**Buffalo & Williamsville Electric Railway, Williamsville, N. Y.**—The residents of Akron, N. Y., have petitioned the Buffalo & Williamsville Electric Railway to extend its lines from Williamsville to Akron. The company now operates a line between Buffalo and Williamsville and officials of the company are inclined to build the desired extension.

**\*Asheville, N. C.**—It is reported that surveys are now being made under the direction of the J. G. White Engineering Corporation, New York, for an electric railway from River Falls, S. C., to Asheville, about 60 miles. W. A. Smith, Hendersonville, N. C., is reported interested.

**Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.**—It is reported that this company plans the construction of an extension to Hudson.

**Cleveland (Ohio) Railway.**—This company plans to construct an extension on Lakeside Avenue from Ontario to East Ninth Street.

**Oakwood Railroad, Dayton, Ohio.**—This company has applied to the Public Utilities Commission for authority to

issue \$10,000 in bonds, the proceeds to be used for improvements.

**Dover (Ohio) Millersburg & Western Railway.**—This company plans the construction of six bridges in connection with its proposed line from Dover to Millersburg. D. F. A. Wheelock, Woodward Building, Warren, Pa., engineer. [July 29, 1916.]

**\*Lorain, Ohio.**—It is reported that plans are being considered by the Board of Commerce of Lorain for the construction of an electric railway to connect the residence and business districts with a new industrial center on the East Side.

**\*Troy, Ohio.**—Plans are being considered by the Troy Chamber of Commerce for the construction of an electric railway between Troy and Pleasant Hill and probably to Greenville.

**Oklahoma Railway Company, Oklahoma City, Okla.**—This company has placed a surveying crew in the field for the purpose of locating a line northeast from Guthrie to Langston, Coyle, Perkins and Stillwater for an extension of the interurban line. The proposed new line will traverse a rich agricultural section and also touch two important state institutions, including the Oklahoma Agricultural and Mechanical College at Stillwater.

**Tulsa (Okla.) Street Railway.**—Plans are being made by the city of Tulsa and the Tulsa Street Railway to repair the Third Street viaduct. The cost is estimated at about \$6,071.

**Pacific Power & Light Company, Astoria, Ore.**—This company has informed the City Council that it is ready to extend its line over Date Street as soon as the improvements under way on that thoroughfare are completed.

**Wilkes-Barre & Hazleton Railway, Hazleton, Pa.**—It is reported that the Wilkes-Barre & Hazleton Railway plans to construct an extension from Hazleton to Tamaqua. The new line would branch off from the present line near Black Ridge and then pass through Cranberry, Tresckow to Quakake Valley. It would extend to the Tresckow Waterfalls and would also pass over a steep grade on Quakake Mountain.

**Hershey (Pa.) Transit Company.**—This company reports that it is building two small reinforced concrete bridges near Campbelltown.

**Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.**—This company is reported to be considering the purchase and electrification of the Pittsburgh, Lisbon & Western Railroad, extending from New Galilee to Lisbon, in addition to the plan of an extension from Darlington, through East Palestine and New Waterford to connect with the Youngstown & Southern Railway at Columbiana.

**Womelsdorf (Pa.) Richland & Myerstown Street Railway.**—The Lebanon Valley Construction Company has the contract for the construction of this company's line from Womelsdorf and Myerstown to Richland, 8 miles. [Sept. 30, '16.]

**\*Greenville, S. C.**—Preliminary surveys are being made for the construction of an electric railway from Greenville to Asheville, N. C., via Hendersonville. Russell N. Edwards, Indianapolis, is interested.

**Dallas (Tex.) Northwestern Traction Company.**—Work will be begun by this company early in November on the construction of its proposed line from Dallas to Krum. It is proposed eventually to construct the line to Wichita Falls. E. P. Turner, Dallas, president. [Sept. 9, '16.]

**El Paso (Tex.) Electric Railway.**—This company has asked the City Council for authority to place its wires underground in the downtown district.

**San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.**—A contract has been awarded by the San Antonio, Gonzales & Interurban Company for the construction of its line between Houston and San Antonio to T. D. McLaughan at about \$600,000. Steeve Holmes, Leesville, Tex., president.

**San Antonio & Austin Interurban Railway, San Antonio, Tex.**—Vories P. Brown, president of the San Antonio & Austin Interurban Railway, reports that construction on this company's line to connect San Antonio and Austin will be begun before the end of the year. The project has been



held up by the European war, but financial backing has now been assured. [Jan. 20, '16.]

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—The Board of Public Works, at a recent meeting, granted the petition of the Puget Sound Traction, Light & Power Company to reconstruct its track on Lakeside Avenue and East Sprague Street.

**West Virginia Traction & Electric Company, Wheeling, W. Va.**—It is reported that this company contemplates the construction of an extension to Morgantown.

### SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—This company has sold a considerable part of its twenty-acre tract at Seventh and Central Avenues to the wholesale Union Terminal Company and will change the location of its carhouses now occupying the ground sold, to the eastern part of Los Angeles, near Echandia Junction. A similar carhouse will be constructed at Watts. The cost of the new carhouses will be approximately \$120,000. The shops of the company will be removed to Torrance.

**Illinois Traction System, Peoria, Ill.**—A new station will be erected by the Illinois Traction System at Mount Olivet.

**International Railway, Buffalo, N. Y.**—This company has awarded a general contract to John Moon, Lockport, for the construction of a new passenger terminal in Lockport. The structure will be of concrete and steel construction and will replace the present frame building which has been in use for thirty-five years. Work will be started at once. The new station will be used by the Buffalo & Lockport and Lockport & Olcott divisions of the International Railway and by the Buffalo, Lockport & Rochester Railway. The cost will be about \$23 600. The International Railway and the New York Central Railroad will construct a joint passenger terminal for interchange facilities at Burt, N. Y. The Lockport & Olcott division of the International Railway crosses under the Ontario division of the New York Central Railroad at Burt, but the two stations have been almost ½ mile apart. Under an agreement reached, a shelter-house 12 ft. long and 8 ft. deep with an overhanging roof will be built on the New York Central Railroad's right-of-way; a 4-ft. wide stairway will be constructed from the steam tracks to the cut of the electric line and a platform 25 ft. long and 4 ft. wide will be laid along the International Railway's tracks.

**Hershey (Pa.) Transit Company.**—A report from this company states that it has just completed a new carhouse with a capacity for thirty-five cars.

**The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.**—This company has broken ground for a new carhouse at Ravenna Park, near Milwaukee. The new building will replace the old Farwell station, which was erected at North and Farwell Avenues in 1888, when the company was operating horse cars. Included in the facilities in this carhouse will be a running repair shop, car cleaning and washing bays and car storage space. A substation will also be erected on this site to serve East Milwaukee and White Fish Bay, and provisions will be made in this building for the station offices and employees' club rooms.

### POWER HOUSE AND SUBSTATIONS

**Connecticut Company, New Haven, Conn.**—A building permit has been granted the Connecticut Company for the construction of an addition to its power house in Grand Avenue. The structure will be 78 ft. x 148 ft., two stories and of fireproof construction. It is estimated that the new plant, complete with equipment for producing power, will cost about \$250,000.

**Albia Light & Railway Company, Albia, Iowa.**—Preparations are being made by the Albia Light & Railway Company for remodeling its plant. New equipment will include one 100-kw. and one 350-kw. generating unit for light and power, one 200-kw. generator to supply energy for the railway, and three 250-hp. water-tube boilers.

**Dover, Millersburg & Western Railway, Dover, Ohio.**—This company, which proposes the construction of an electric railway between Dover and Millersburg, will construct a power house and two substations. D. F. A. Wheelock, Woodward Building, Warren, Pa., engineer.

## Manufactures and Supplies

### FOREHANDEDNESS DESIRABLE IN BUYING

**Manufacturers Striving to Make Deliveries—Roads Should Co-operate—Better Prices and Quicker Delivery Will Result**

Production is now the watchword in manufacturing circles. Raw materials are high priced and hard to obtain and labor is extremely scarce, so that every manufacturer, big or little, must be on guard to accelerate the progress of all jobs in his plant. This driving spirit which now pervades the manufacturing industry to a greater extent than ever before has brought forth opinions and helpful suggestions pointing toward the betterment of the existing relations of railways and producers of railway supplies.

Many manufacturers stress their organizations and ingenuity to the limit in their endeavor to speed up production only to have their successful efforts nullified by slow freight delivery. In like manner, by strenuous manufacturing efforts, deliveries are made, and then it is learned that the road has not received the complementary materials. Thus one manufacturer's efforts have been for naught because another's delivery was slow or, more likely, because of a lack of systematic ordering by the purchaser.

This has happened so frequently of late that the sales forces of the supply side of the industry are preaching to their customers "forehandedness in buying" at a risk of engendering enmity or at least of straining the harmonious relationships of earlier years—years when any order of any size was welcome, no matter "if it had to be delivered yesterday."

The situation to-day, with the innumerable delays in delivery due to lack of raw materials, car shortage, etc., will no doubt result in an improvement in future buying methods, and benefits will accrue to both buyers and sellers.

One well-informed salesman, in making comparisons with the buying methods in the electric railway and in other industries, characterized the situation as follows: "The average electric railway makes its purchases in a hand-to-mouth way, but as soon as it places an order it puts pressure on the manufacturer in an endeavor to get quick delivery. The electric roads as a class don't look far enough ahead for their construction and maintenance materials. They don't show the forehandedness that is evident in the steam railroad or electric power industries. If the electric railways paid more attention to purchasing their supplies ahead of the time of actual use, that is, sent out specifications, a reasonable period in advance of the purchase dates, they could get better prices and the manufacturer could give better quality and quicker deliveries."

This article was written in a spirit of helpfulness. The same motive actuated the author of the foregoing statement, and if by discussion of this subject of forehandedness in buying, both buyer and seller are helped, this article will indeed have been of service.

It might be well to consider in detail some of the conditions confronting the average buyer. He must first learn what he needs to buy. This information comes from various associates in the other departments of his property. The authority for the expenditure must be given, and the degree of need for the article will establish the requirements for the time of delivery. Unless his associates are well organized the purchasing agent of an electric railway has considerable official work to do in his own organization before he can afford to call in bidders on the material needed. Thus it is seen that the matter of forehandedness in buying is not alone a question for the purchasing department but for the entire engineering and operating staff.

Lack of definiteness in specifications, demands for quick delivery and haste in placing orders, all combine to involve a purchase. If a road waits until the last minute before calling in the manufacturers it often happens that sufficient time is not available in which the salesmen can go to the actual bottom of the proposition and make really close estimates on cost, profit and delivery. Thus the road may not



have the advantage of final figures from the maximum number of bidders, nor, in the haste for delivery, can the long-time-service basis be used in deciding which material should be purchased. Materials of lowest first cost and of least long-time efficiency usually can be delivered quickest. And so, by delay in buying, a road is sometimes forced to make purchases that otherwise would not be considered. This means increased ultimate cost.

There are instances in which emergencies demand quick delivery. Manufacturers exert every resource to meet these cases. But such orders could much more readily be filled by the manufacturers as a group if a policy of earlier attention to future needs was regularly followed by the railways.

Take, for example, heating and ventilating equipment for cars. Most orders for such material for maintenance and reconstruction uses are being placed now, although they should have been under active consideration in June or July. "Load factor" and "rush hour" problems are just as important to the manufacturer as they are to the railway operator. It has been noticed year after year that the first cold snap of fall brings forth inquiries for heaters and ventilators that might just as well have been discussed by buyer and seller months before when the manufacturer's plant was working part time. On the contrary, a rush comes to his plant in the fall and early winter, and he must run double time. This means a higher average cost for the year's output and a lessening of the rigidity of inspection, for both of which the manufacturer could properly charge the customer. Also it means difficulties in making deliveries. This argument applies to any other seasonable supply just as much as it does to heating and ventilating equipment.

Another point to be considered here is this: Why do some roads order cars for delivery in the spring and summer and yet not specify the heater equipment until fall? Why not order such material earlier and specify future delivery, thus giving the manufacturers' plants a more even load factor and enabling them to produce a product of higher quality? Contract delivery dates could more easily be met, and the cost to the road would be the same. Such orders are paid for on or after delivery, so the only extra cost to the road would be the small effort necessary to advance the date of ordering.

These thoughts are based on the experiences of several years, not on those of the present year when deliveries of raw materials to the manufacturer and finished supplies to the railways have been most uncertain. Reserve stocks were available in 1915 with which to fill the comparatively small orders placed that year, but in 1916 conditions have changed. No warehouse stocks are now available, and the roads have ordered fully twice as great a volume of supplies, so that now no one may safely guarantee prompt deliveries.

It is thought that the present situation with regard to deliveries will have its educational effect, an effect which it is to be hoped will assure greater forehandedness in the buying of electric railway supplies.

#### INCREASE IN THE PRODUCTION OF LUMBER FOR THE CURRENT YEAR

For the first eight months of 1916 as compared with the same period in 1915, there was an increase of 13.5 per cent more lumber produced and 10.5 per cent more lumber shipped, according to an official statement by the secretary of the National Lumber Manufacturers' Association, Chicago, Ill. This statement was based on reports from more than 500 firms. The total production in 1916 will be approximately 42,000,000,000 ft.

#### ROLLING STOCK

Cleveland (Ohio) Railway is reported to be in the market for 250 cars.

Detroit United Railways, Detroit, Mich., is contemplating the purchase of 100 cars for city service.

Lake Shore Electric Railway, Cleveland, Ohio, is said to be in the market for fifteen 60-ft. cars.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., is said to be in the market for three interurban cars.

Long Island Railroad, New York, N. Y., noted in the ELEC-

TRIC RAILWAY JOURNAL of Sept. 9 as being in the market for forty-five trail cars and fifteen coaches, has ordered this equipment from the Pressed Steel Car Company.

New Jersey Motor Transportation Company, Newark, N. J., has ordered thirty auto-buses from the George C. Marx Company, Brooklyn, N. Y., to be used in and around Newark, N. J. The buses will have a capacity of thirty passengers each.

Michigan United Railways, Jackson, Mich., is reported as considering the purchase of forty trail cars and is receiving this month from the St. Louis Car Company twenty new cars which will be distributed among the local railway properties at Lansing, Kalamazoo and Battle Creek.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has purchased a snow plow from the Wason Manufacturing Company to be used on interurban service. This is an eight-wheel snow plow with a 30-ft. body, and is somewhat unusual on account of having side wings 5 ft. high extending from the heel of the plow back to the center of the journal box. It will be operated by GE-201 box-type motors, K-35-G controllers, and GE air-brake equipment. Delivery is to be made by Dec. 15, 1916.

#### TRADE NOTES

L. S. Brach Supply Company, Newark, N. J., has discontinued its branch office, 142 Liberty Street, New York, N. Y., and hereafter all offices will be consolidated at the factory, 127-129 Sussex Avenue, Newark, N. J.

The Elcon Company, New York, N. Y., has received an order to equip twelve cars being built by the Osgood-Bradley Car Company for the Union Street Railway of New Bedford, Mass., with the Elcon white porcelain enameled stanchions.

Holden & White, Chicago, Ill., through their Eastern agents, the U. S. Metal & Manufacturing Company, have received an order from the Public Service Railway, Newark, N. J., for 400 Garland ventilators. They have also received an order from the Elmira Water, Light & Railroad Company for four Johnson type "B" fare boxes.

Goldschmidt Thermit Company, New York, N. Y., has nearly completed its first contract with the Public Service Railway of New Jersey which is for 200 welded rail joints made by the thermit insert process. The joints are being installed on Maple Avenue, Merchantville, N. J. The tracks on this street are being relaid, using Pennsylvania Steel Company 80-lb. rails, section 238. On completion of the welding one of the equipments comprising a rail grinder, a squeezing machine and a set of crucibles, preheaters and molds is to be kept in the Camden district and a similar equipment will be kept in the Newark district.

Lord Manufacturing Company, New York, N. Y., reports the receipt of the following orders: six Lord screenless air cleaners from the Boston & Worcester Street Railway, Boston, Mass.; six Q.-P. trolley catchers from the Worcester Consolidated Street Railway, Worcester, Mass.; ten Q.-P. trolley catchers from the Monongahela Valley Traction Company, Claremont, W. Va.; fifty Q.-P. trolley catchers from the International Railways, Buffalo, N. Y.; 152 Giant brakes from the Public Service Railway, Newark, N. J., and Giant brakes from the American Car Company for use on the new cars of the Pekin (Ill.) Traction Company.

#### ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has issued a pamphlet on the Crouse-Hinds Imperial incandescent headlights for interurban service.

The Eureka Company, North East, Pa., has issued a catalog on trolley wheels. Among the latest developments in trolley wheels illustrated are the bushingless wheels and an improved type of sleet cutting wheel.

Chicago Pneumatic Tool Company, Chicago, Ill., has just issued bulletin E-44 superseding bulletin E-31 on Duntley electric portable tools, which include sensitive drilling stands and heavy duty side spindle drills.

Whiting Foundry Equipment Company, Harvey, Ill., has issued catalog 110 describing and illustrating their electric traveling cranes, Gantry traveling cranes, electric mono-rail trolleys, and jib cranes. A large number of illustrations show the various appliances of this company installed on electric railways, industrial and central station plants.





## Rule o' Thumb

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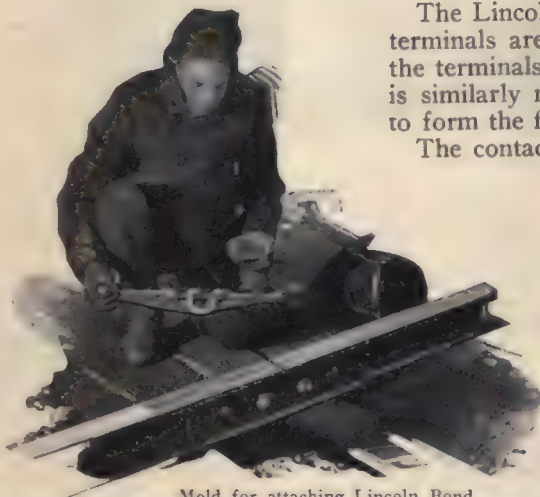
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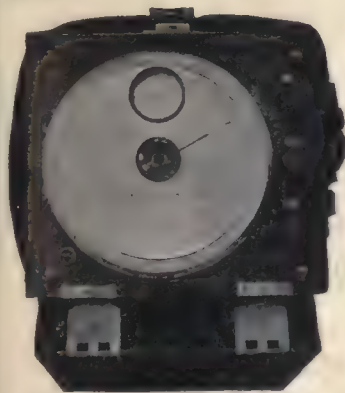
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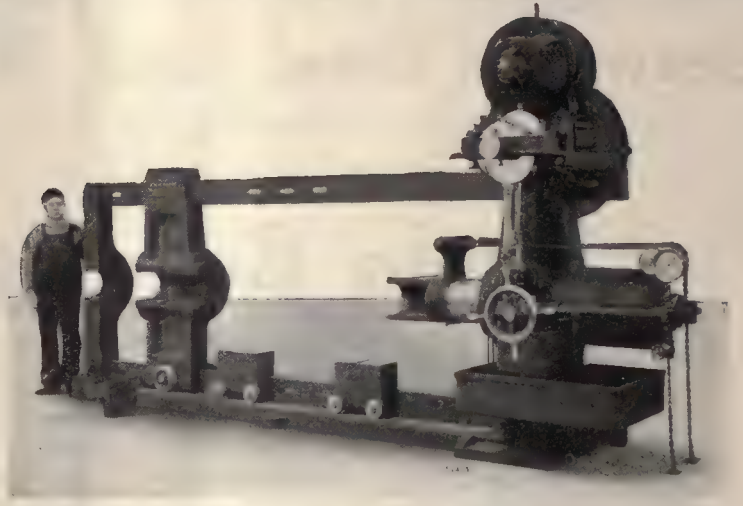
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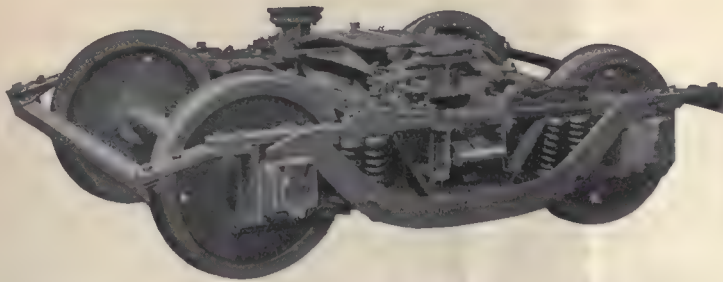
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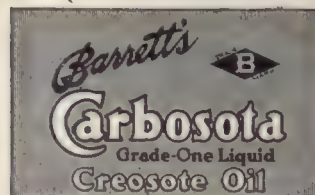
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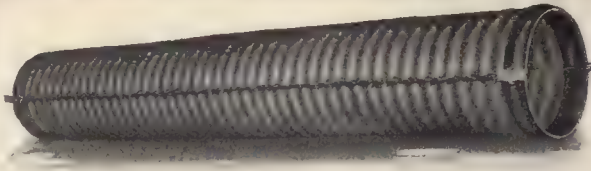


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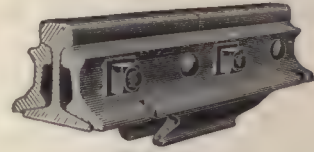
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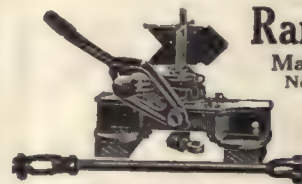


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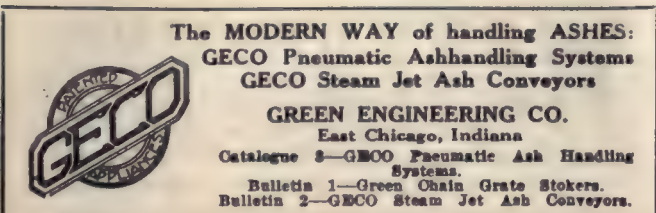
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Clear and Black Baking Insulating Varnishes  
Oil Proof Finishing Varnishes  
Impregnating Compounds  
Wire Enamels

FOR THE MANUFACTURER—OPERATOR—REPAIRER

Inquiries invited. Catalogue on request.  
We gladly assist in selection.

THE STERLING VARNISH COMPANY  
PITTSBURGH, PENNA.  
Manchester, England

## P & B Insulation

guarantees good electrical service. Electric railway men have been buying P & B Products for 32 years—good evidence of quality.



Weatherproof Tape  
Insulating Compound  
Baking Varnishes  
Air-Drying Varnishes  
Solid Compounds

Write for Booklets

The Standard Paint Company  
Woolworth Building, New York  
Boston Chicago Denver

## Holden & White

### Electric Railway Accessories

Electric Railway Sales Distributors for:

The Wasson Engineering & Supply Co.—Wasson Air-Retrieving Trolley Base. (U.S.)  
The Garland Ventilator Co.—Ventilators.  
The Joliet Railway Supply Co.—Self-Centering Center Plates and Anti-Friction Side Bearings.

Chicago District Representatives for:

The Drew Electric and Mfg. Co.—Line Material,  
Columbia Machine Works & Malleable Iron Co.—Car & Shop Equipment.  
Miller Trolley Shoe Co.—Trolley Shoe.  
The Specialty Device Co.—Blerce Anchors and Guy Wire Protectors.

1508 Fisher Building, CHICAGO

Ohmlac is a preservative against RUST, moisture, acids, alkalis, sulphur and electrolysis.

**For All Electrical Work**

such as field coils, armatures, wires, cables, transformers, batteries, etc., and

**For Iron and Steel**

such as trucks, underframes, poles, cars, bridges, culverts, roofs, structural steel, etc.

Send for full information

**UNION INSULATING CO.**  
Sole Agents and Distributors  
Great Northern Building  
CHICAGO

### Full Power with High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

### Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

The Buckeye  
Jack Mfg. Co.

Alliance, Ohio



3

## FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK & MFG. CO.  
142 Oxford Street, Philadelphia

## KINNEAR Steel Rolling Doors FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fire-proof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the  
KINNEAR MANUFACTURING CO., Columbus, Ohio  
BOSTON PHILADELPHIA CHICAGO



## I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue

**INSULATING TAPE**  
of Quality

**STANDARD**  
Woven Fabric Co  
Walpole, Mass.



## Every Passenger Comfortable and Current Used Economically

That is the rule on lines which put the control of their car-heating up to the

### Consolidated System of Thermostatic Regulation



When car temperature falls too low, the Consolidated Thermostat switches the heaters into circuit—when the car becomes too warm, it cuts the heaters out.

That's all there is to it—just a little, tireless, never-sleeping sentinel that guards the passengers' comfort and protects you against wasteful use of current.

Bulletin No. 13-A describes it—write for your copy.

### Consolidated Car-Heating Co.

New York

Albany

Chicago



### HALE & KILBURN

No. 199

"Walkover" Interurban Car Seats in the Latest All Steel Center Entrance Cars, "Liberty Bell" Route, Lehigh Valley Transit Company.

This seat, with embossed Pressed Steel arm rests, was selected for service on the famous high-speed road between Philadelphia and Allentown because of its comfort, convenience and general applicability. The Hale & Kilburn No. 199 was the one seat that met fully the exacting standards of this progressive property.



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### HALE AND KILBURN CO.

Philadelphia New York Chicago Washington San Francisco

## Cleveland Fare Boxes

### Cleveland Fare Box Co.

5318 St. Clair Avenue  
Cleveland, Ohio

## WE CAN CUT YOUR COST OF HEATING CURRENT

WRITE FOR THERMOSTATIC CONTROL INFORMATION

# GOLD

**ELECTRIC HEATERS** Cut Installation and Maintenance Charge.

**VENTILATORS** Also Ventilate in Stormy Weather.

**THERMOSTATS** Save Current.

**ORIGINATED** the use of **NON-CORROSIVE** Wire for Electric Car Heaters.

**ORIGINATED** The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

Gold Car Heating & Lighting Co., 17 Battery Pl., New York



## Johnson Registering Fare Boxes

used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

WRITE FOR NEW BOOKLET

### JOHNSON FARE BOX COMPANY

Jackson Blvd. & Robey St.  
Chicago, Ill.

U. S. Metal & Manufacturing Co.  
165 Broadway, New York City, N.Y.

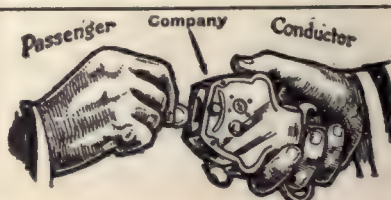
For the Answer to your Fare Collection Problems  
Write for

"Earnings Per Passenger Mile"  
It tells how the

**BONHAM TRAFFIC RECORDER**

Will Meet Your Needs

The Bonham Recorder Co., Hamilton, Ohio



**Direct Automatic Registration**  
By the  
**Passenger**

**Rooke Automatic Register Co.**  
Providence, R. I.





## The Proof

of the absolute value of "Bound Brook" Trolley Wheel Bushings, is easily seen in their rapidly-increasing sales. Last year, over two million—this year, *already* crowding last year's record.

All genuine graphited "Oil-Less" Bearings have always been made at Bound Brook, N. J., in the United States of America, by the

**Bound Brook Oil-less Bearing Co.**

FORMERLY

Graphite Lubricating Company



## Sleet Scrapers

We are rapidly approaching the season that is the operating man's worst enemy. To insure continuity of Service—to keep the wheels moving—

### Nuttall Sleet Scrapers

should be on every car. Their cost is small—but they are mighty valuable when needed. We have a big stock of Nuttall Sleet Scrapers on hand now—we're ready to make quick shipment.

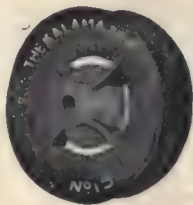
**UNION ELECTRIC COMPANY**

Terminal Warehouses

Pittsburgh, Pa.

## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



**THE STAR BRASS WORKS**

KALAMAZOO, MICH., U. S. A.

## PANTASOTE

The National Standard  
for Car Curtains and  
Car Upholstery

### AGASOTE HEADLINING

The only headlining made in one solid piece. Will not separate, warp or blister. Waterproof and homogeneous.

**The Pantasote Company**

11 Broadway, New York

People's Gas Bldg., Chicago, Ill.

797 Monadnock Bldg., San Francisco, Cal.

## PROVIDENCE

FENDERS

## H-B

LIFE GUARDS

**The Consolidated Car Fender Co., Providence, R. I.**

Manufacturers of The Providence Fender and H-B Life Guard

**Wendell & MacDuffie Co., 61 Broadway, New York**

General Sales Agents

### The Best Shade Rollers for Cars

SPECIAL shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature

*Stewart Hartshorn*



**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading Railroads. For details address

**AMERICAN MASON SAFETY TREAD CO.**

Main Offices: Branch Offices: Boston, New York City, Chicago, Lowell, Mass. Philadelphia, Kansas City, Cleveland, St. Louis.

## Ventilation—Sanitation—Economy—Safety

All Combined in

**THE COOPER FORCED VENTILATION HOT AIR HEATER**

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

**THE COOPER HEATER CO., CARLISLE, PA.**



## SEVEN THOUSAND TROLLEY POLES IN STOCK

Not Gas Pipe but High Carbon, Butt-Welded Poles Made from Special Skelp and Capable of Standing 35 to 40 Pounds Wheel Pressure on the Trolley Wire. Immediate shipment.

**NUTTALL - - PITTSBURG**

## Snow Fighting is an Easy Problem



when your cars are equipped with

## ROOT Spring Scrapers

No. 7, our latest, designed especially for low cars, is simple and easy to operate. This scraper can be installed in a 10 or 12 inch clearance. An adjustable operating arm permits any desired pressure of flanges on the rails. Locks up or down by single operation of lever. Has renewable flange fingers and can be safely operated forward and backward.

We have a scraper for every type of car.

Order now.

**Root Spring Scraper Co., Kalamazoo, Mich.**

Dead Easy to Fill



Will Save You Money

Free Sample

**A. F. DAUM**

Sole Manufacturer, Pittsburgh, Pa.

Maker of the First Successful Refillable Fuse on the Market

# TULC

We base all our "ads" on facts. We guarantee TULC and stand back of it. Others have shown a large saving with TULC. It has been proven to be the best lubricant.

**THE UNIVERSAL LUBRICATING CO.**  
Schofield Building CLEVELAND, O.



Have you our new

## Trolley Wheel Bulletin

Write for your copy

**The Eureka Company North East, Pa.**

The Big Three

**D & W Fuses, Deltabeston Wire  
Delta Tape**

**D & W Fuse Co., Providence, R. I.**



# BRAKE SHOES

## Uniformity in Brake Shoes

Although scrap enters into the manufacture of a brake shoe, uniformity in the wearing capacity of the finished product is highly desirable. A happy-go-lucky foundry cannot attain this uniformity; we can and we do. Otherwise we could not afford to sell brake shoes on a guaranteed mileage basis.

*Awarded Gold Medal, Panama-Pacific Exposition*

**American Brake Shoe & Foundry Co.**

30 Church St., New York

McCormick Bldg., Chicago

Chattanooga, Tenn.

## Rollway Bearings are Sensible Bearings

If anti-friction bearings were not designed to assure easy installation and replacement by your shopmen, their power, lubrication and inspection savings would not be obtainable in practice.

Rollway Bearings are long past the experimental stage. We *know* just what they can do in city, suburban and interurban service. We offer you a sensible, standard product.

*Write us today for service records.*



The Railway  
Roller Bearing Co.  
Syracuse, N. Y.

## UNION SPRING & MFG. CO. SPRINGS

COIL AND ELLIPTIC

M. C. B. Pressed Steel Journal Box Lids

General Office: First Nat'l Bank Bldg.  
PITTSBURGH, PA.

Works: New Kensington, Pa.

50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.  
Missouri Trust Bldg., St. Louis, Mo.

## E.G. Long Company

EDWARD H. MAYS, President  
Offices, 50 Church Street, New York

SPRINGS  
CASTINGS  
FORGINGS

**Peckham Truck Parts**  
**Diamond Truck Parts**  
**Car and Truck Accessories**

**ELECTRICAL REPRESENTATIVES**

**Union Spring & Mfg. Co.**

Leaf and Coil Springs

*MCB Pressed Steel Journal Box Covers*

## JACKS

Barrett Track and Car Jacks  
Barrett Emergency Car Jacks  
Duff Ball Bearing Screw Jacks  
Duff Motor Armature Lifts

The Duff Manufacturing Co., Pittsburgh, Pa.

## VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**

2325 So. Pauling St., Chicago, Ill.



# SEARCHLIGHT SECTION

## An Unusual Opportunity

Just purchased the entire equipment of the Elkins Electric Railway Co., Elkins, W. Va., consisting of 9 miles of 75 and 80 lb. rail, same amount of 4-0 copper wire, poles, ties, bridges, bonds for the rail, spikes, bolts, frogs and switches, cross irons, cross overs, electric power plant, voltage 550 d.c. 5 passenger cars, 2 work cars, and 2 freight cars. Everything complete, and ready to operate.

Will make very attractive prices on this material to move quickly. Please wire if interested.

**M. K. FRANK**  
Frick Bldg., Pittsburgh, Pa.  
or **L. K. HIRSCH**  
Randolph Hotel, Elkins, W. Va.

## ARCHER & BALDWIN

114-118 Liberty Street New York City  
TELEPHONE 4337-4338 RECTOR

### Rotary Converters, 25 Cycle

2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

### Rotary Converters, 60 Cycle

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy. Above will be sold with or without transformers.

### Railway Motors

2—75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

## MACGOVERN AND COMPANY INC.

FRANK MACGOVERN, Pres. & Gen. Mgr.  
114 LIBERTY STREET NEW YORK CITY  
'Phone, 3375-3376 Rector

### 60 CYCLE ROTARY CONVERTERS

- 1 1000 KW. Gen. Elec., type HC, form P, 6 phase, 1667 amps., 600 volts D.C., 360 R.P.M.
- 2 300 KW. Gen. Elec., type HC, form P, 6 phase, 500 amps., 550 volts D.C., 900 R.P.M., with end play and speed limit device.
- 1 200 KW. Westinghouse, 3 phase, 600 volts D.C., 900 R.P.M., with starting motor.

### 550 VOLT DIRECT CURRENT UNIT

300 KW. Westinghouse, 550 volt, 145 R.P.M., dir. conn. to 16½" and 30½" x 30" Buckeye tandem engine.

Immediate Delivery

**THIS IS OF NECESSITY ONLY A PARTIAL LIST—  
SEND FOR CATALOG**

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE

WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

Undisplayed  
Cards Under  
Positions Wanted  
Cost 50 Cents  
for 25 Words

*Keep Your Eyes  
on the Journal's  
Searchlight  
Section*

Machinery  
Advertisements  
Undisplayed  
Cost \$1.50  
for 50 Words



# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplaced advertisements cost **two cents a word**, minimum charge 50 cents an insertion, payable in advance.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Desk Room Wanted or For Rent, Business Opportunities, Employment Agencies, and Miscel-

laneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplaced advertisements cost **three cents a word**, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost \$2.40 an inch.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

1/8 p. (1 1/2 x 3 3/4 ins.)	.....\$5.00	1 in. (1 1/2 x 1 1/2 ins.)	.....\$3.00
1/4 p. (2 1/2 x 3 3/4 ins.)	.....10.00	4 inches (4 x 2 1/2 ins.)	.....11.60
1/2 p. (5 x 3 3/4 or 2 1/2 x 7 ins.)	.....20.00	8 inches (8 x 2 1/2 ins.)	.....22.40
3/4 p. (10 1/2 x 3 3/4 or 5 x 7 ins.)	.....40.00	15 inches	.....40.50
1 page (10 1/2 x 7 ins.)	30 inches	.....\$80.00	

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page	.....\$80 a page	18 pages	.....\$56 a page
3 pages	.....72 a page	26 pages	.....53 a page
6 pages	.....64 a page	40 pages	.....52 a page
12 pages	.....58 a page	52 pages	.....50 a page

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### FOR SALE

#### Wheel Lathe For Sale

Niles Lathe, 52" swing, 2 heads, motor drive, modern and in fine shape. Sell at a bargain. L. Brenner & Co., Lebanon, Pa.

#### A Metal Opportunity

Take advantage of the high prices of metal. We are cash buyers of all grades of scrap metal. Our specialty is buying electric plants, storage battery plants, storage battery plates and sediment. We buy small lots as well as large lots. Write us and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Co., 30-31 India Wharf, Boston, Mass.

#### Engine for Sale

One horizontal McIntosh & Seymour tandem compound condensing engine, 11 in. and 20 in. x 30 in., 240 I.H.P., at one-third cut off; 300 I.H.P. at one-half cut off; 125 lb. steam pressure; 26 in. vacuum. Flywheel, weight 13,000 lb.; 32 in. face, 11 ft. diam. This engine is in first class operating condition and could be shipped immediately. The American Railways Company, Witherspoon Bldg., Philadelphia.

#### Our Prices Will Interest You

Two 25 kw., 250 v., 100 amp., 300 r.p.m. D.C. Westinghouse generators, connected to 9 x 11 Westinghouse engine.  
Four panel switchboards with two direct Thomson retorting wattmeters.  
Two Weston ammeters—two Weston oval meters with necessary switches.  
Two small combination compressed switchboards.  
Two 1/4 kw. D.C. generators for producing sparks driven by belt on main shaft.  
One Gould 4 x 5 power pump No. 315 with compressed air tanks, used for starting engine, pumps are belt driven by 1 1/4 hp. Westinghouse electric motor, serial No. 368683.  
This machinery has been used a very short while and is practically new, best cash offer takes it. Must be removed at once. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

Before Buying **Rails, Cars, Locomotives, Machinery Equipment** get Zelnicker's September Bulletin, containing 40 pages of Real Bargains.

### ZELNICKER IN ST. LOUIS

423 First Nat. Bank, Chicago  
910 Hennen Bldg., New Orleans

#### WORKS:

24th to 26th & McCausland, E. St. Louis, Ill.  
General Office: St. Louis

### MISCELLANEOUS WANTS

#### Locomotive Wanted

One Locomotive of approximately 50 tons weight and equipped with four 75 hp. motors. State age, mileage performed, type of equipment and general specifications. Box 1206, Elec. Ry. Jour.

#### Wanted to Buy

From owners one light single truck enclosed trolley car, double end, 18' to 22' over posts, used, complete, 30 hp. motors. Give price on body alone for Peckham No. 9 A. truck also. Address "H.," Box 424, Oklahoma City, Oklahoma, Capital Traction Company.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

ELECTRIC railway executive with 12 years' experience, construction and operation, four properties, excellent references, city or interurban. Good organizer and systematizer, all departments. Short efficient methods with results, desires position; will locate anywhere. Box 1212, Elec. Ry. Jour.

GRADUATE engineer wishes position as engineer of maintenance of way with electric railway company. Twelve years' experience on city and interurban lines. Now employed, desire change. Box 1214, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

### POSITIONS WANTED

IS your Freight Department troubling you or do you anticipate starting one? I have experience, initiative and courage. The more difficult your proposition, the better. Write me. Box 1227, Elec. Ry. Jour.

POSITION wanted as armature winder. Have had 10 years' experience. Now employed. Can give best of references. Box 1222, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

STREET railway superintendent with years of experience desires to make a change. Thoroughly understands all branches of the work. Box 1215, Elec. Ry. Jour.

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### POSITIONS VACANT

CHIEF engineer for Power Station of large Interurban Railway in Central States. Responsible position which demands experienced engineer who can operate economically. Give experience, references and wages expected. Box 1213, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

WANTED—Bright and energetic man for accident investigating work in New York City; good opportunity for advancement. State age, former employment and references. Address E. L., Box 2, Station U, New York P. O.

WANTED—One line foreman and two good linemen by railway and lighting company in Pennsylvania. Box 1221, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

LARGE street railway company located in New York State requires a first-class armature winder, familiar with direct current railway motors. Opportunity also for first-class electrician or wireman familiar with installation and maintenance of controllers, motors and cables. Reply stating age, experience and wages expected. All answers treated strictly confidential. Box 1226, Elec. Ry. Jour.

Get Your Wants into  
the Searchlight



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.  
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

**Acetylene Apparatus.**  
(See Cutting Apparatus, Oxy-Acetylene.)

**Acetylene Service.**  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Alloys, Steel and Iron.**  
Titanium Alloy Mfg. Co.

**Anchor, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Automobiles and Busses.**  
Brill Co., The J. G.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Taylor Elec. Truck Co.

**Axles, Car Wheel.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbiting Devices.**  
American General Engrg. Co.  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Bankers and Brokers.**  
Halsey & Co., N. W.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings and Bearing Metals.**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Hardy & Sons, Wm. A.  
Long Co., E. G.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings, Oilless, Graphite, Bronze and Wood.**  
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**  
Gurney Ball Bearing Co.  
Hess-Bright Mfg. Co.  
Railway Roller Bearing Co.

**Bearings, Roller Slide.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.  
Zeinicker Sup. Co., W. A.

**Blow Torches for Soldering and Brazing.** (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boilers.**  
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Bond Clips.**  
Electric Railway Improve. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.  
Prest-O-Lite Co., Inc.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms.** (See also Poles, Ties, Posts, Etc.)  
Bates Expanded Steel Truss Co.  
Electric Service Supplies Co.  
Int'l Creosoting & Constr. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

**Brake Adjusters.**  
Smith-Ward Brake Co.

**Brake Shoes.**  
Amer. Brake Shoe & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

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Allis-Chalmers Mfg. Co.  
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For complete information regarding Model 341 write for Bulletin No. 2004. Other models in this group are Model 370 A.C. and D.C. Portable Ammeter, described in Bulletin No. 2003; Model 310 Single-Phase and Direct Current Portable Wattmeter, and Model 329 Portable Polyphase Wattmeter, both described in Bulletin No. 2002.

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Some 41,373 leather-lunged American citizens attended the great 14-inning game between the Brooklyn Dodgers and the Boston World's Champions at Braves Field, Boston, October 9.

A large portion of this multitude was carried to and from the grounds in articulated cars fitted with

## Laconia Center-Entrance Sections

of which a few are shown lined up on Commonwealth Avenue. The Boston Elevated Railway has in use or on order 225 Laconia sections.

Laconia center-entrance sections offer an ideal way of using existing small cars to double the capacity of operating units without any increase in platform cost, or

Of handling present traffic at lower platform cost and with less congestion of downtown tracks.

Let us help you to  
make your small cars profitable





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WORKS:

WINTON PLACE  
CINCINNATI, OHIO

## The St. Louis Car Company

## QUALITY SHOPS

8000 N. Broadway  
St. Louis



## Bundook

Nothing is new under the sun except the regular stock of Antiques in the Cairo bazaars.

Few tourists dare return home without some souvenirs to stimulate the imagination of the romances of Ancient Egypt.

Battle axes, spears and similar bundook—the product no doubt of the tourist's own country—contribute to the excess baggage of the returning globe trotter.

It's his own choosing and he gloats in his blissful ignorance.

If, however, he had put an expert on the work he would have had something *real*.

It all goes to show the folly of monkeying with something on the strength of meagre knowledge.

Carbon brushes, for instance, is a tricky subject as railway men know, and that is why we provide real engineering service in selling Morganite brushes. They are sold on engineering prescription only—good engineering—good brushes.

To say that this costs no more is misleading—it costs far less than haphazard choice—and the beauty of it is that you get the real thing in service.

Investigate.



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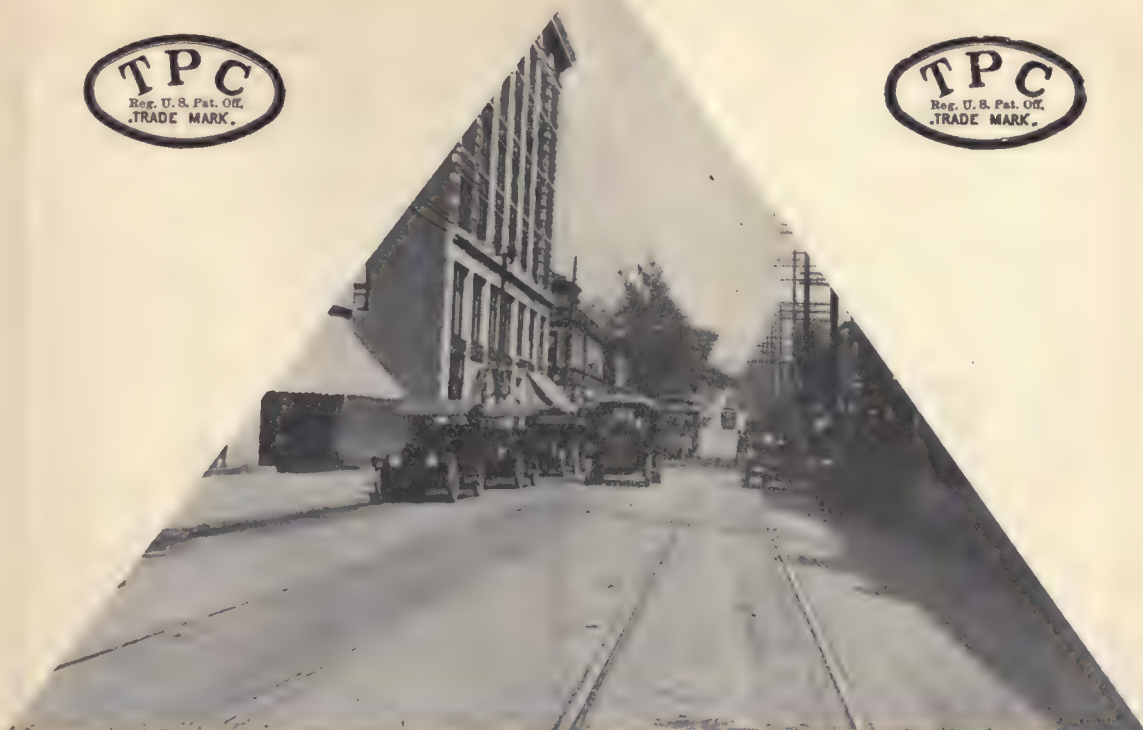
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# TITANIUM TREATED RAIL

## Carrying 1000 St. Louis Cars a Day on Olive Street

Olive Street is one of the principal thoroughfares of St. Louis. Each track in the section pictured carries 365,000 cars per annum, and the average weight per car is 45,000 lb.

Last year the 112 lb. 9 in. girder rail laid on this street in 1906 was replaced by 132 lb. Lorain Section 440 rail made according to this specification:

Carbon .....	0.70 to 0.85
Silicon not over .....	0.20
Phosphorus not over .....	0.04
Manganese .....	0.60 to 0.90

and

Treatment with 1/10 Per Cent Metallic Titanium

It's characteristic of Titanium users to order more. St. Louis' first Titanium-treated rail was bought in 1912.

When will you begin?

## TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

Processes and Products Patented

General Office and Works:  
Niagara Falls, N. Y.



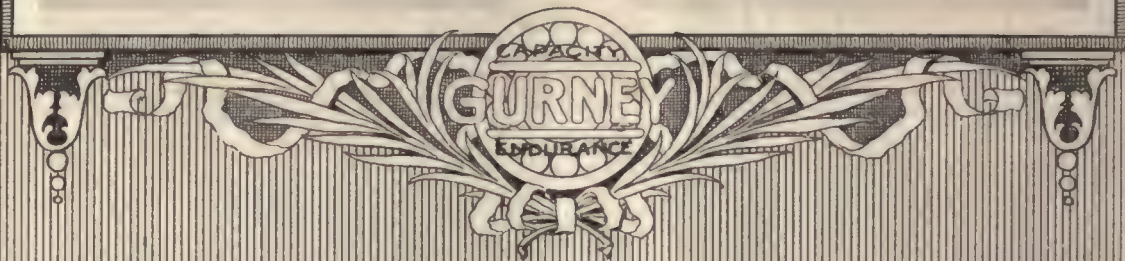
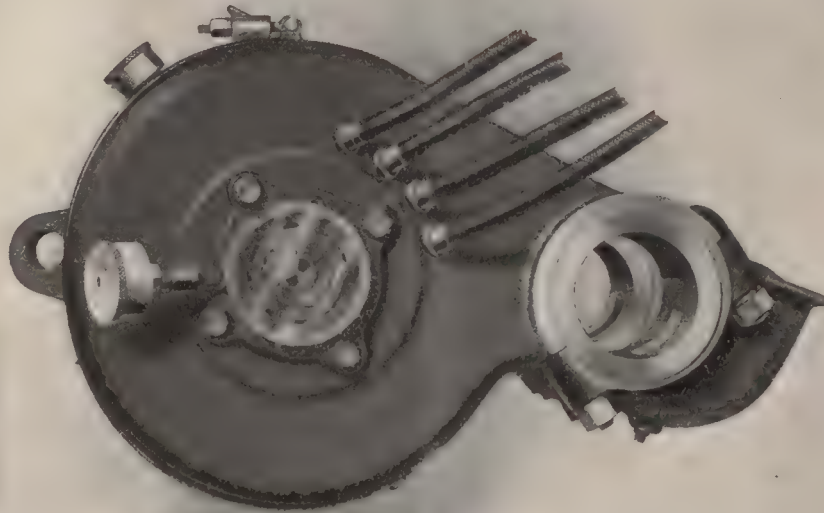
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**T**HE INCREASED INITIAL COST OF A BALL BEARING MOTOR IS LIKELY TO BE VERY MUCH LESS THAN THE COST OF BUT A SINGLE REPAIR OF A STRIPPED OR A BURNED-OUT ARMATURE AS A RESULT OF A WORN PLAIN BEARING. GURNEY BEARINGS IF GIVEN ONLY A SMALL PERCENTAGE OF THE CARE REQUIRED BY PLAIN BEARINGS WILL LAST FOR THE LIFE OF THE MOTOR. ORDERS FOR NEW MOTORS SHOULD SPECIFY GURNEY BALL BEARINGS AS PART OF THE EQUIPMENT.

# GURNEY BALL BEARING CO.

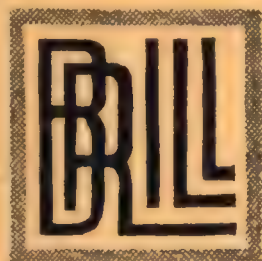
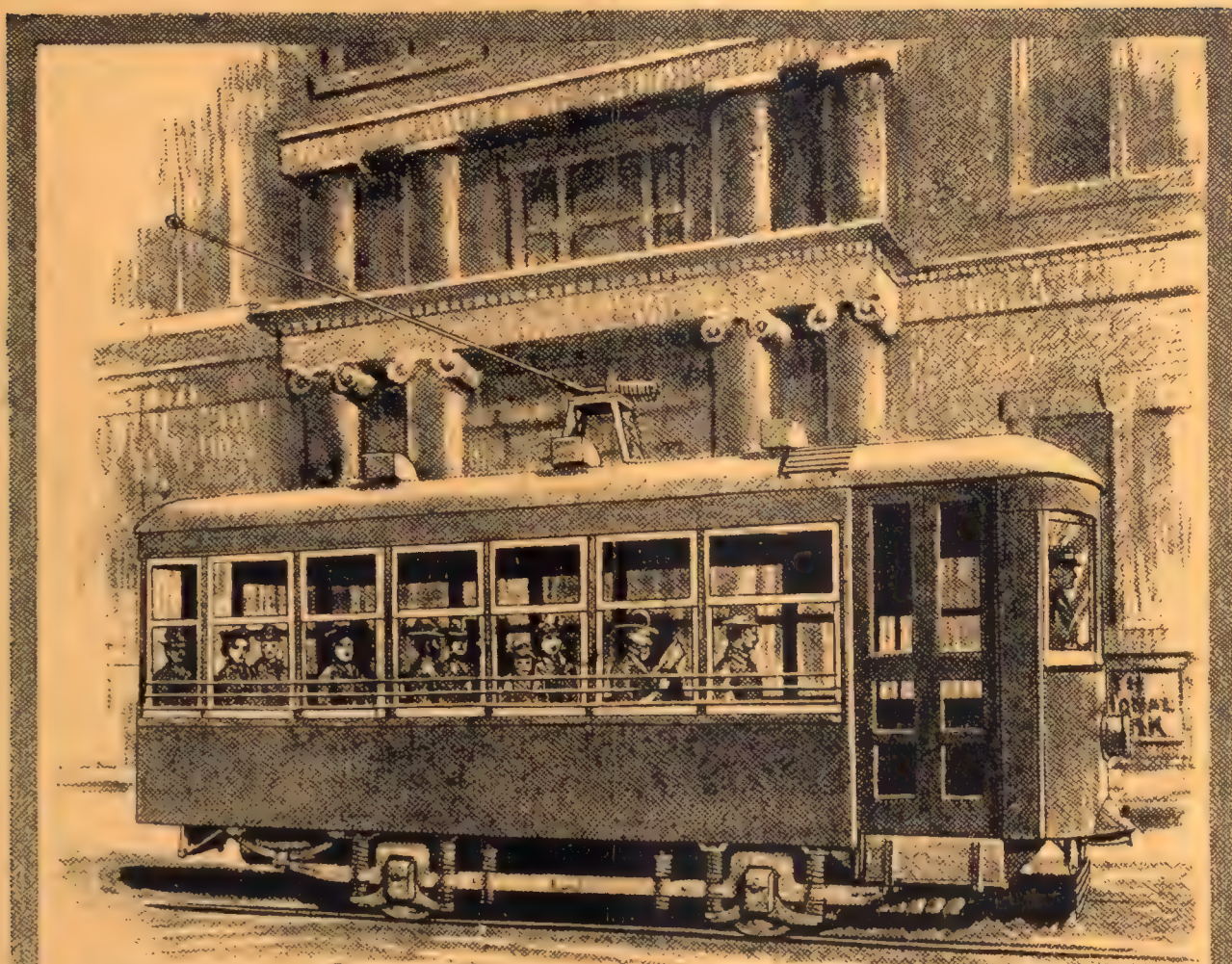
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## JAMESTOWN NEW YORK

CHICAGO ILL.

NEW YORK CITY





Brill cars of the one-man type include an extra light-weight design known as the Birney One-Man Car as it was designed by Mr. C. O. Birney, Designing Engineer of the Stone & Webster Management Association. With a seating capacity of thirty, the weight of the body, less electrical equipment, is but 4,050 lb. A light but powerful steel bottomframe, steel plate side-girder construction and continuous tee-posts, provide a substantial support and an ample resistance to all strains so that long life and maintenance costs are insured. A double-leaf entrance-exit door operates pneumatically in conjunction with the step. At the rear is an emergency swing-door secured by manually- and pneumatically-operated locks. Bulletin 223 fully describes and illustrates the car.

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

AMERICAN CAR COMPANY  
ST. LOUIS, MO.

G. C. KUHLMAN CAR COMPANY  
CLEVELAND, OHIO

WASON MANUFACTURING COMPANY  
SPRINGFIELD, MASS.



# HAVE YOU READ

## Mountain Torrents Harnessed to Electrify a Great Railway

Chicago, Milwaukee & St. Paul  
Railway

## ELECTRICITY Masters the Mountain Barriers

Chicago, Milwaukee & St. Paul  
Railway

## The Great Advance

From the Frontier to the Electric Locomotive

TRANSPORTATION has made the Great West what it is today. It has made the Chicago, Milwaukee & St. Paul Railway the greatest of the West. It has made the Chicago, Milwaukee & St. Paul Railway the greatest of the West. It has made the Chicago, Milwaukee & St. Paul Railway the greatest of the West.



Chicago, Milwaukee & St. Paul  
Railway

# What the Chicago, Milwaukee & St. Paul

Railway says about the General Electric 3,000-volt d. c. locomotives that haul its star passenger trains, the "Olympian" and the "Columbian," over the continental divide?

Here are a few of the advertisements that the progressive "St. Paul" has placed in thousands of newspapers and other publications throughout the United States.

The obvious stimulus to passenger traffic is only one of the significant results of this project which is the greatest electrification in the world.

## General Electric Company

General Office  
Schenectady, N. Y.



Sales Offices  
in all large cities

6359

## Leading the March of Railroad Progress

"St. Paul Road" Admires to the Fore  
Makes Mountain Travel Clear and Mountain's User Clear

Chicago, Milwaukee & St. Paul Ry.

## WORLD'S MIGHTIEST LOCOMOTIVES

During the past few years, America has produced the most powerful locomotives in the world. The Chicago, Milwaukee & St. Paul Railway has been the first to use them.

Few Facts About "The St. Pauls" Electric Locomotives

Chicago, Milwaukee & St. Paul Ry.

## Master Feats of the Railroad World

Chicago, Milwaukee & St. Paul  
Railway



Sale of Power by Interurban Railways

# ELECTRIC RAILWAY JOURNAL

New York, October 28, 1916

McGraw Publishing Co., Inc.

Vol. 48, No. 18 10c a copy



## "The Double Ratchet Does It"

—eliminates lost motion—and doubles the speed of application of the

## Horne Double Acting Brake

and stops the car in half the time required by other ratchet hand brakes.

The Horne Brake converts a 75-pound force at the handle into a formidable pull of 2930 pounds at the brake rod—

Its sheer, brute power and wonderful speed turn emergencies into mere incidents—

All this in a floor space only 13" x 7", a height of 16" and a weight of but 67 pounds.

And the cost? Less than that of any other hand brake. May we arrange for demonstration?

**Lord Mfg. Co., New York**

SERVICE ON LINE OF  
VALLEY TRANSIT CO.



# Westinghouse

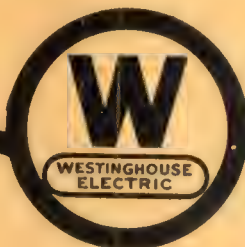
## No 306 CV

65 Horsepower



***Our Standard For Heavy City and Moderate-Speed Interurban Service.***

A box-frame development of the celebrated Westinghouse No. 306 Railway Motor.—All the principal wearing parts of the No. 306-CV are duplicates of those of its predecessor, and it embraces the same excellent features of design which made the No. 306 so justly popular.



*We have a Standard  
Motor for Every Service.*

*Leaflet 3834 gives details.  
Ask nearest office for a copy.*

**Westinghouse Electric & Manufacturing Co.**

**East Pittsburgh, Pa.**

Atlanta, Ga.  
Baltimore, Md.  
Birmingham, Ala.  
Bluefield, W. Va.  
Boston, Mass.  
Buffalo, N. Y.  
Butte, Mont.  
Charleston, W. Va.

Charlotte, N. C.  
Chicago, Ill.  
Cincinnati, Ohio  
Cleveland, Ohio  
Columbus, Ohio  
\*Dallas, Tex.  
Dayton, Ohio  
Denver, Colo.

Des Moines, Iowa  
Detroit, Mich.  
\*El Paso, Tex.  
\*Houston, Tex.  
Indianapolis, Ind.  
Joplin, Mo.

Kansas City, Mo.  
Louisville, Ky.  
Los Angeles, Cal.  
Memphis, Tenn.  
Milwaukee, Wis.  
Minneapolis, Minn.

New Orleans, La.  
New York, N. Y.  
Omaha, Neb.  
Philadelphia, Pa.  
Pittsburgh, Pa.  
Portland, Ore.  
Rochester, N. Y.  
St. Louis, Mo.

Salt Lake City, Utah  
San Francisco, Cal.  
Seattle, Wash.  
Syracuse, N. Y.  
Toledo, Ohio  
Washington, D. C.  
\*W. E. & M. Co. of  
Texas



# ELECTRIC RAILWAY JOURNAL

VOLUME XLVIII, No. 18

NEW YORK, OCTOBER 28, 1916

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

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CLEVELAND, Leader-News Bldg.

PHILADELPHIA, Real Estate Trust Bldg.  
SAN FRANCISCO, 502 Rialto Bldg.

LONDON, 10 Norfolk St., Strand.  
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One week required for change of mailing address. New and old addresses must be given.

Circulation of this issue 7250 copies





## A Specialty and its Specialists

A Manager recently remarked to his President:

"We use Westinghouse air brakes because they're the best. They're made by specialists who make nothing but air brakes and give their undivided attention to that. They have the experience of a lifetime and know the business from A to Z.

Then there's their field corps of engineers and expert inspectors—it's the best thing I ever saw—and it's free. They'll work out any braking problem for you and supply you with the brake best suited to any particular class of service. We rely on them absolutely and call them in right along. They've helped us over many a rough place and saved us thousands of dollars real money."

*Westinghouse Apparatus includes Westinghouse Service*

## Westinghouse Traction Brake Company

*General Offices: Wilmerding, Pa.*

PITTSBURGH:

Westinghouse Building

CHICAGO:

Railway Exchange Building



NEW YORK:

City Investing Building

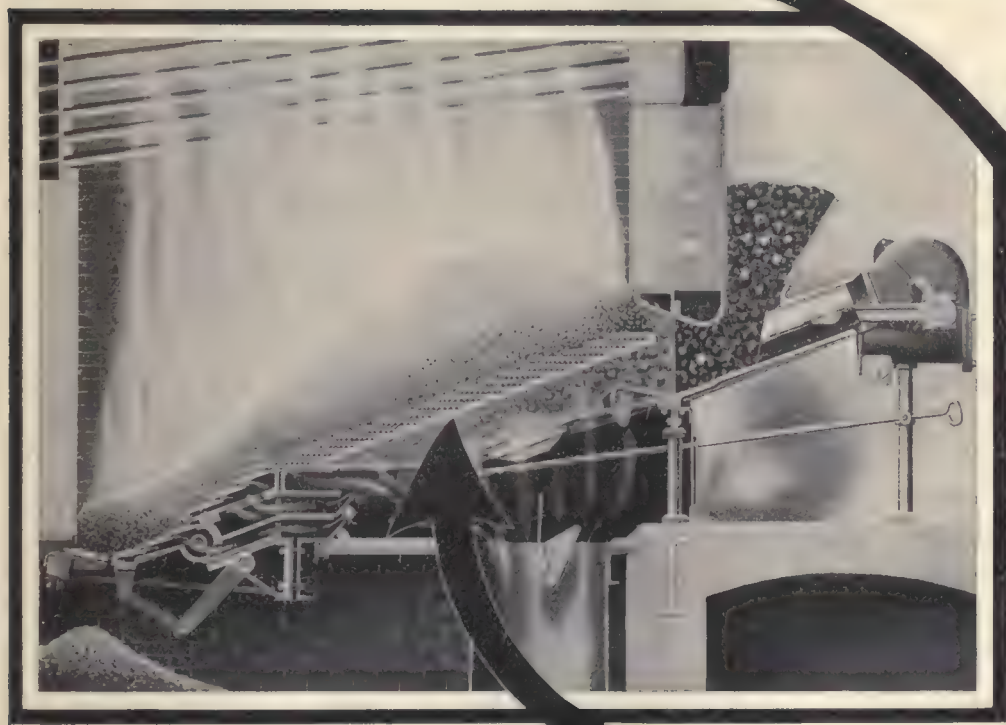
ST. LOUIS:

Boatmen's Bank Building



# There Is No Escape For the Products of Combustion

They are released beneath and must pass up  
through an incandescent bed of fuel and  
the flame zone above. Thus they are  
completely and effi-  
ciently consumed.




## The Westinghouse Under Feed Stoker

The Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.



Form 1204

CLASS OF SERVICE	SYMBOL
Day Message	Blue
Day Letter	Blue
Night Message	White
Night Letter	N L



## WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT  
GEORGE W. E. ATKINS, VICE-PRESIDENT  
BELVIDERE BROOKS, VICE-PRESIDENT

CLASS OF SERVICE	SYMBOL
Day Message	Blue
Day Letter	Blue
Night Message	White
Night Letter	N L

If none of these three symbols appears after the check (number of words) this is a day message. Otherwise its character is indicated by the symbol appearing after the check.

RECEIVED AT 1398 BROADWAY, NEW YORK ALWAYS OPEN  
B79NY.YU. 70 COLLECT DPR

WB CHICAGO ILL OCT 19 1045A

ELEC RY JOURNAL 239 WEST 39 ST NY

THE FORTWAYNE AND NORTHERN INDIANA TRACTION CO HAS REPORTED TO BE IN THE MARKET TEN ONE MAN CARS THE CLEVELAND RAILWAY REPORT TO BE IN THE MARKET FOR FIFTY CARS AND POSSIBLY TWO HUNDRED AND FIFTY THE DETROIT UNITED RAILWAY REPORTED TO BE IN THE MARKET FOR ONE HUNDRED CARS FOR CITY SERVICE GRANDRAPIDS GRANDHAVEN AND MUSKEGON RAILWAY SAID TO BE IN MARKET FOR TWO OR THREE INTERURBAN CARS.

F.M.HAAS  
1251PM.

*One  
Example  
of how  
things  
are going*

## The Big Normal Buying Power of Electric Railways Is Now Abnormally Active

The pressure of greatly increased traffic due to generally good business which has been shown in reports of increasing earnings for months—

The condition of the money market making the financing of improvements relatively easy—

The absolute necessity of improving and increasing equipment and making extensions—long put off because of the previously adverse outlook—

The prudent policy of “making hay while the sun shines”—

All these factors are now combining to make buying active not alone for rolling stock but in **every** department of the business.

If you have anything to sell to electric railways **now** is the time to **push** for business.

And now as always the advertising pages of Electric Railway Journal will prove a powerful ally in securing the interest of the field.

**Electric Railway Journal**





## Catches and Holds O-B Trolley Catcher

is so designed that it will not allow the pole to "step up."

The pole jumps, the dogs on the catcher fly out and engage the stops on the case. Naturally, the pole rebounds. The O-B Catcher is so designed as to be unaffected by this rebound and it does not let go of the pole.

The Catcher is ruggedly built and will stand up under severe service.

Equip your cars with O-B Catchers and your repair bills will be less.

*Described and listed in Catalog No. 16.*

**The Ohio Brass Co.**  
Mansfield, Ohio



# Phono-Electric

## —The Wire of Long Life



Measured 0.475 in. in 1908  
0.4614 in. in 1916

That's the maximum wear after eight years of 60 miles an hour pantograph service on the Denver & Interurban Railway with Phono-Electric Trolley Wire.

Do you believe that a copper wire of 0000 section could have served thirty-two to forty-five trains a day without having been distorted, worn, burnt or broken in many places?

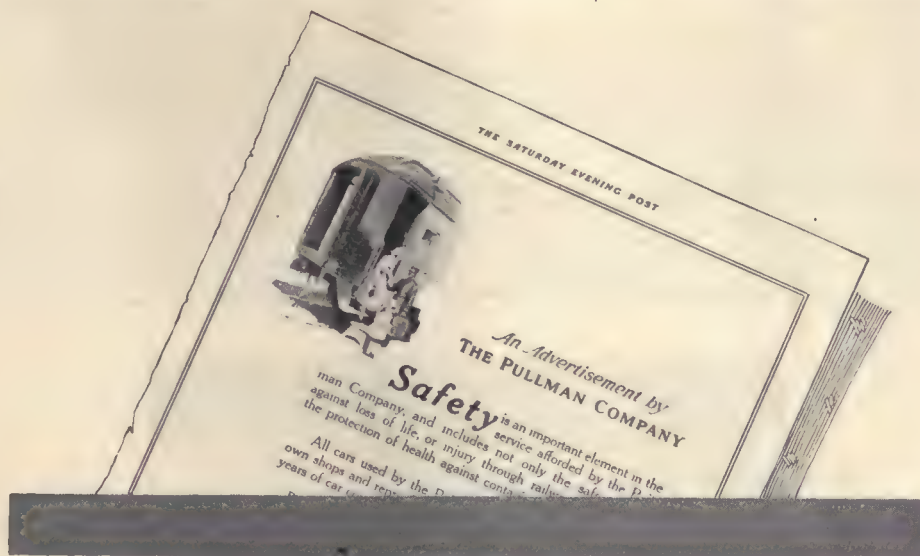
Of course it couldn't! When the builders of this great high-tension road (11,000 volts) wanted a trolley wire that would stay up in all stress of wind and weather they selected Phono-Electric.

Do it, too.

BRIDGEPORT BRASS CO.  
BRIDGEPORT CONNECTICUT







# Safety

*Safe* transportation is *best* transportation—and the shortest route to the public's *confidence*.

The smash—the accident that can never happen—but does—

*That* can deprive you of the public's confidence in the tick of a split-second—

To say nothing of the *money* loss.

Any *live* railway organization can produce *speedy* service—

And United States Electric Signals will make that service *safe*.

*Sidestep* the smash, and *hold* the confidence of the public—

Install United States signals.

They keep the cars *moving*—and moving *safely*.

Yes, you *can* afford to—ask us.

## United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.







Their  
Use  
Spreads



The  
Rails  
Don't

## International Steel Twin Ties

The pioneer installation of International Steel Twin Ties was made at Altoona, Pa., in 1909, by the Altoona & Logan Valley Electric Railway. The second was made by the Cleveland Railway in 1910. The Scioto Valley Traction Company followed suit early in 1911 with an installation at Circleville, Ohio.

A big thing is slow in gathering momentum, but once started—well, judge for yourself—1916 sees nearly 100 different railways all over the country using International Steel Twin Ties.

Today there are more than 450 International miles of city track in paved streets alone. And more being added every day.

Why? Because International Steel Twin Ties mean low ultimate cost, and low first cost despite the high price of raw steel.

Because they prevent spreading of rails, prevent low joints, save concrete and excavation, and keep the track perfectly aligned.

**Don't defer writing. We can make immediate shipment**

**The International Steel Tie Company**  
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal., Los Angeles, Cal.,	R. I. Cooper Co., Seattle, Wash.	J. E. Lewis & Co., Salt Lake City, Utah, Dallas, Texas.	Maurice Ioy, Philadelphia.	William H. Ziegler, Minneapolis, Minn.
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# Safety Car Lighting Fixtures

For Attractive Car Lighting  
and Absolute Safety



The well established fact that brightly lighted cars produce greater returns than dull, dingy cars sells thousands of Safety Car Lighting Fixtures each year.

Good lighting these days is good advertising. It reflects prosperity, pleases the public and makes for attractiveness.

Safety Fixtures are standard the world over on account of their exclusive safety features. They are designed for use with various types and sizes of reflectors and lamps so that proper relation between the reflector and lamp is assured in any combination.

You will actually save money by using Safety Fixtures.

Write for our booklets giving complete information.

## **ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

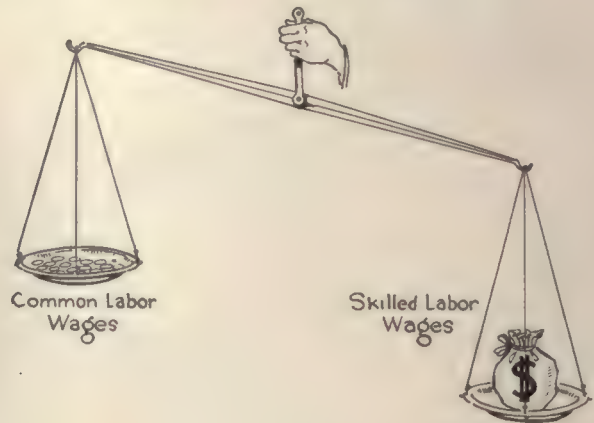
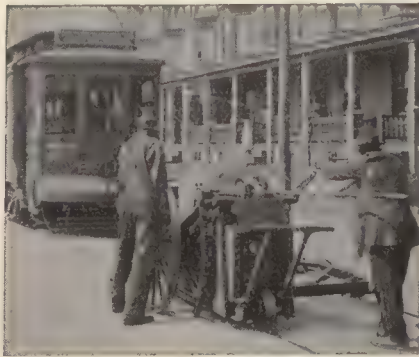
PHILADELPHIA  
17th and Cambria Sts.

NEW YORK  
50 Church St.

CHICAGO  
Monadnock Bldg.



# Adjusting the Scale of Wages for Track Grinding



There's no need to tell you that labor is high. You know that. You also know that the acuteness of the labor situation varies directly with the class of labor. The higher the class—the higher the wage.

There never was a time more ripe for economies in track grinding labor. Labor dissipated in having to do one grinding job over two or three times is little short of criminal under present labor conditions. It is grand larceny when the grinding equipment you are using requires **skilled** labor at sky-high prices.

It is true economy at all times to use a

## Reciprocating Track Grinder

on your tracks. It is especially economical at the **present time** in cutting labor costs. Here are three reasons why:

- Does its work right the **first** time.
- Does its work in the **shortest** time.
- Does its work **without** skilled operators.

If you could see its reciprocating drive, its flat, large, abrasive, self-adjusting grinding element you would understand why the Reciprocating Grinder is a labor cost cutter, a time-saver and a rail rejuvenator that

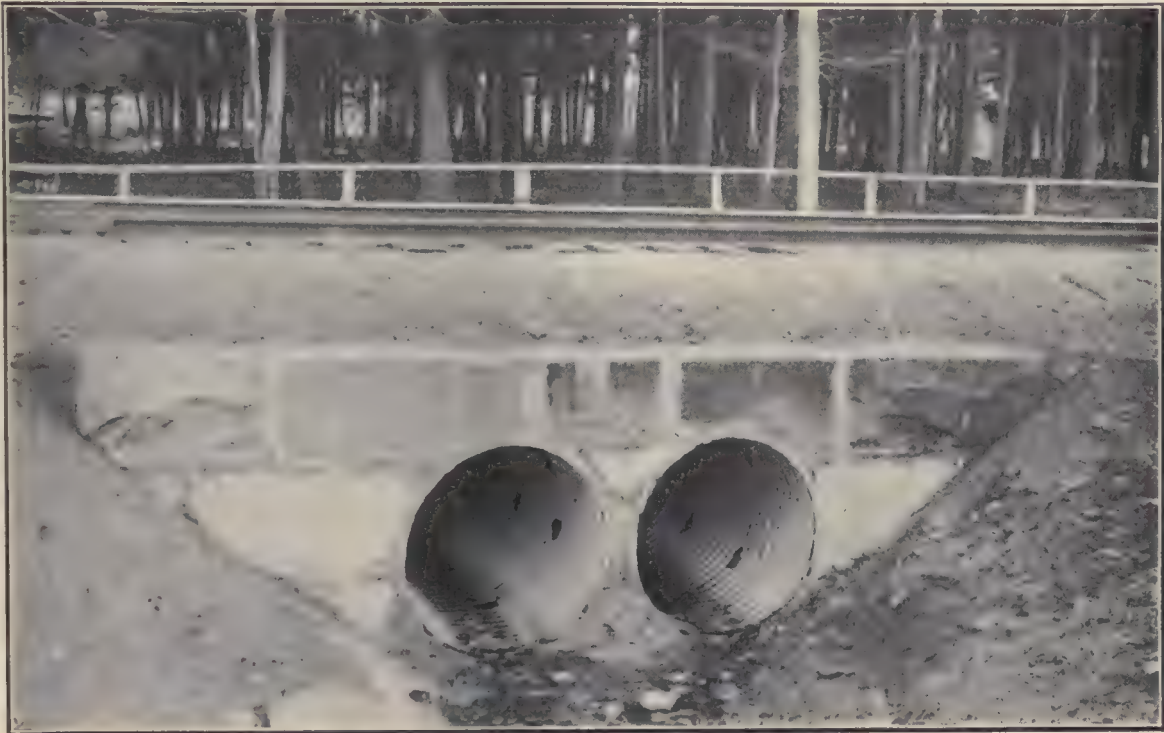
## Works Right the First Time and All the Time

Now is the time to write us to send your grinder. You can withhold payment for it till you've tried it out.

**Railway Track-work Company**  
30th and Walnut Streets, Philadelphia



# From Maine to California



And From the Farthest Corners of the Earth  
Practical Men Endorse

## "ARMCO" IRON CULVERTS

Their material represents the triumph of modern science as applied to the corrosion problem. It has been established that iron resists rust in proportion to its purity, evenness and solidity. In these respects "Armco" Iron is the nearest approach to per-

fection which has been commercially attained.

The makers have demonstrated that corrugated culverts can be made to give service for immensely long periods. Their statements are confirmed by a multitude of satisfied users.

Write the nearest Manufacturer for information and prices on "Armco" (American Ingot) Iron Culverts, Siphons, Flumes, Sheets, Roofing and Formed Products.

**Arkansas, Little Rock**  
Dixie Culvert & Metal Co.  
**California, Los Angeles**  
California Corrugated Culvert Co.  
**California, West Berkeley**  
California Corrugated Culvert Co.  
**Colorado, Denver**  
R. Hardesty Mfg. Co.  
**Delaware, Clayton**  
Delaware Metal Culvert Co.  
**Florida, Jacksonville**  
Dixie Culvert & Metal Co.  
**Georgia, Atlanta**  
Dixie Culvert & Metal Co.  
**Illinois, Springfield**  
Illinois Corrugated Metal Co.  
**Indiana, Crawfordsville**  
W. Q. O'Neill Co.  
**Iowa, Des Moines**  
Iowa Pure Iron Culvert Co.  
**Iowa, Independence**  
Independence Culvert Co.

**Kansas, Topeka**  
The Road Supply & Metal Co.  
**Kentucky, Louisville**  
Kentucky Culvert Co.  
**Louisiana, New Orleans**  
Dixie Culvert & Metal Co.  
**Maryland, Munsey Bldg.**  
Baltimore, Wm. M. Baker  
**Massachusetts, Palmer**  
New England Metal Culvert Co.  
**Michigan, Bark River**  
Bark River Bridge & Culvert Co.  
**Michigan, Lansing**  
Michigan Bridge & Pipe Co.  
**Minnesota, Minneapolis**  
Lyle Corrugated Culvert Co.  
**Minnesota, Lyle**  
Lyle Corrugated Culvert Co.  
**Missouri, Moberly**  
Corrugated Culvert Co.  
**Montana, Missoula**  
Montana Culvert Co.

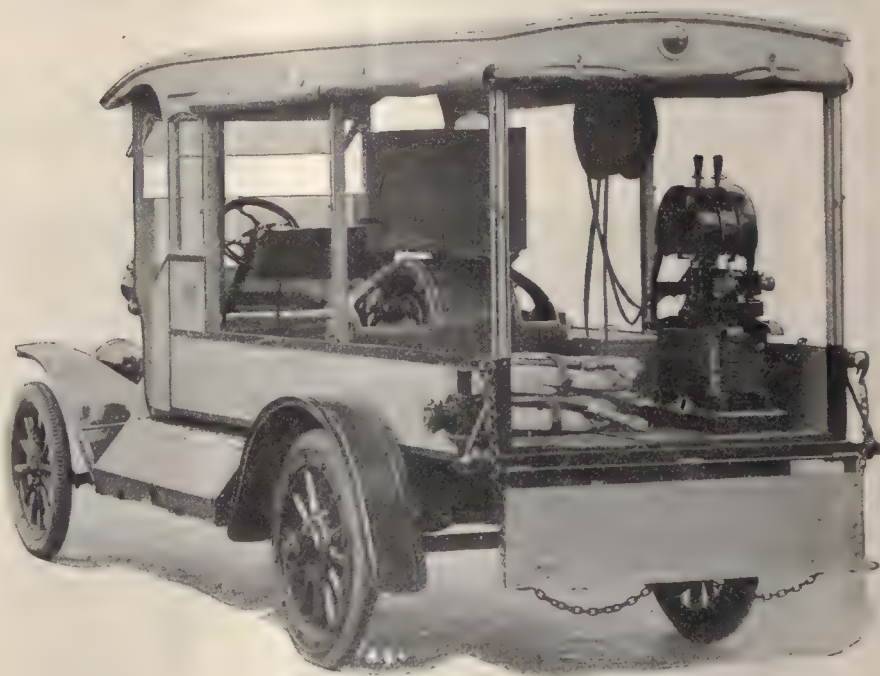
**Nebraska, Lincoln**  
Lee-Arnett Co.  
**Nebraska, Wahoo**  
Nebraska Culvert & Mfg. Co.  
**Nevada, Reno**  
Nevada Metal Mfg. Co.  
**New Hampshire, Nashua**  
North-East Metal Culvert Co.  
**New Jersey, Flemington**  
Pennsylvania Metal Culvert Co.  
**New York, Auburn**  
Pennsylvania Metal Culvert Co.  
**North Dakota, Wahpeton**  
Northwestern Sheet & Iron Works  
**Ohio, Middletown**  
The Ohio Corrugated Culvert Co.  
American Rolling Mill Co.  
**Oklahoma, Shawnee**  
Dixie Culvert & Metal Co.  
**Oregon, Portland**  
Coast Culvert & Flume Co.

**Pennsylvania, Warren**  
Pennsylvania Metal Culvert Co.  
**South Dakota, Sioux Falls**  
Sioux Falls Metal Culvert Co.  
**Tennessee, Nashville**  
Tennessee Metal Culvert Co.  
**Texas, Dallas**  
Wyatt Metal Works  
**Texas, El Paso**  
Western Metal Mfg. Co.  
**Texas, Houston**  
Lone Star Culvert Co.  
**Utah, Woods Cross**  
Utah Corrugated Culvert & Flume Co.  
**Virginia, Roanoke**  
Virginia Metal Culvert Co.  
**Washington, Spokane**  
Spokane Cor. Culvert & Tank Co.  
**Wisconsin, Eau Claire**  
Bark River Bridge & Culvert Co.



## CHAMPION Bonding Truck for City Work

This truck affords a convenient and economical way of mounting the Champion Bonding outfit, which is the latest addition to the



## ERICO Perfected System of Bonding

This motor truck is specially designed for bonding in city streets without interrupting traffic. It carries a complete set of tools and supplies as well as the bonding gang. Bonds can be installed while cars are passing.

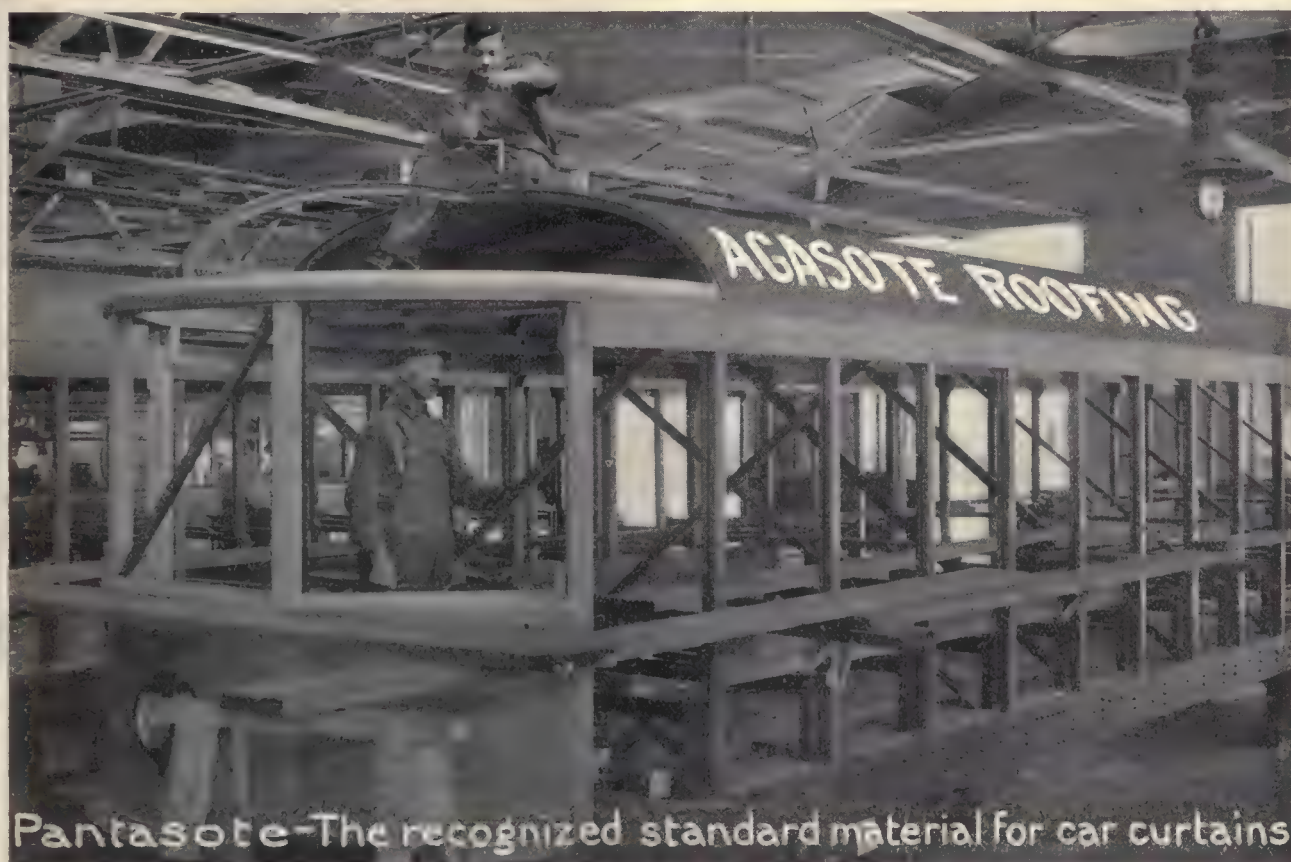


### Champion Brazed Bonds

Applied with low melting  
silver alloy

**The Electric Railway Improvement Co.**  
Cleveland, Ohio





Putting Agasote Roofs on the 147 New Cars in the Shops of Public Service Co., of New Jersey

## Agasote Roofing is Tough Roofing

The strength of Agasote Roofing is pretty plain from this picture, taken during the building of 147 open cars with Agasote Roofs.

The workman, and he is no featherweight, is sitting on a section of  $\frac{3}{8}$ " Agasote without the slightest fear that he will distort it, or fall through it to the floor. The strength of Agasote is ample to carry your usual current collecting equipment, to permit the motorman or conductor to walk on the roof with impunity, and to withstand many a hard blow from a wild trolley pole.

*Agasote Roofing is Better Than Wood and Cheaper*

### The Pantasote Co.

Manufacturers also of Pantasote—the most widely used and highly standardized railway car curtain material on the market.

11 Broadway, New York

People's Gas Bldg., Chicago, Ill.

797 Monadnock Bldg., San Francisco, Cal.



The  
difficulty,

Smithville, July 10, 1916.

Jonesboro Railway Company,  
Jonesboro, Me.

Gentlemen:

We very much regret that we cannot fill your requisition No. 84, for shop and track tools, immediately because of the heavy demand on machine tool makers throughout the country. In fact, we could hardly guarantee to deliver the lathes and drills before six months.

and for furnace and forging equipment to lever jaws and draft rigging is also

Manufacturers of Machinery and Equipment for Electric Railways are doing their utmost to supply the insistent demands for quick and quicker deliveries. It's rush—*rush*—RUSH—*Double Rush*—in their shops, day and night, but still the orders come, and still the demand goes on. Both manufacturers and railways have solved their problems by purchasing and using second-hand machinery and material. To locate quickly the equipment you need so much,

## Use the Searchlight Department of Electric Railway Journal

It  
pays—  
quick

You will be put in touch *at once* with owners who have such apparatus for sale. Searchlight ads reach into every nook and corner of the electric railway industry, whether user or maker. No matter how small the ad, or how inconspicuous, it cannot be hidden. There are no pages in the publication more thoroughly scanned, more carefully read, than the Searchlight ads.

It  
pays—  
big

### Sell Discarded Apparatus

There is a waiting market for any and every piece of Machinery or Equipment which will aid in the manufacture of electric railway supplies. Let this thought be the father to the act of writing out a statement of what you have for sale, to be inserted in the Searchlight Department of "Electric Railway Journal." It is read by the BUYERS.

### Get the Help You Need

Every incompetent in a job keeps some competent man out of it. The proper employee for the place can be found—by using the Searchlight Department. WORKERS read "Electric Railway Journal."

### Do You Want a Position

There are lots of them open—there is a market for your abilities. An "Electric Railway Journal" Searchlight Ad will put you in touch with EMPLOYERS. Advertising rates are low and returns quick.

The  
solution

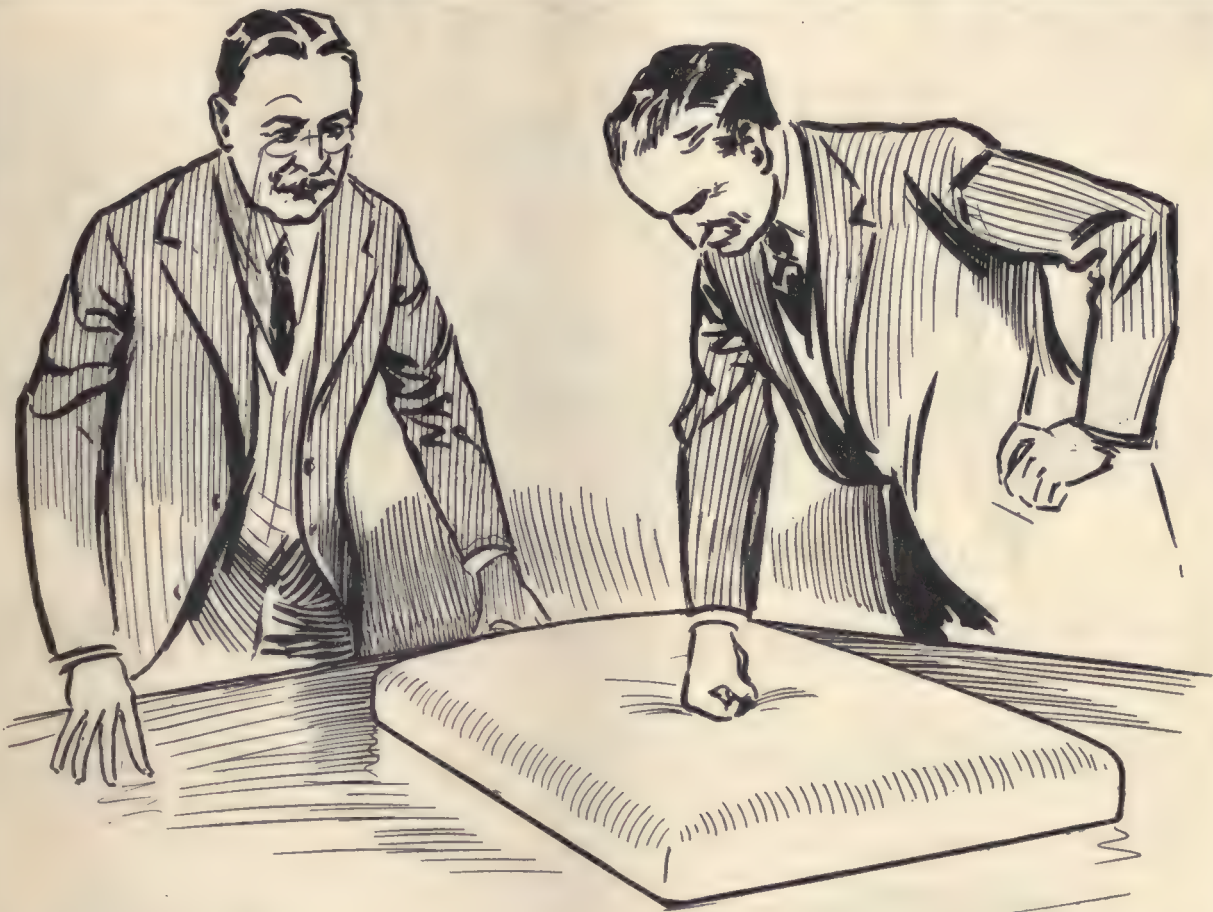
The demand  
make brake levers, brake  
particularly active.

If you must have equipment of this kind pending our building of new tools for you, we suggest an advertisement in the Searchlight Section of the Electric Railway Journal. Without doubt, you will find some manufacturer or railway that will be glad to sell you second-hand equipment at a modest figure. Such an advertisement will cost you only a few dollars and will save you both money and annoyance.

In the meantime, we will make all possible dispatch with your requisition.

Yours truly,  
ELECTRIC RAILWAY SUPPLY COMPANY  
By A.O.B.





## Hale & Kilburn Seats are Right to the Core

There's much more to Hale & Kilburn seats than correct shape and appearance.

Take a Hale & Kilburn rattan cushion, for example.

Cemented to the underside of the rattan is a canvas lining. This serves for general reinforcement and also discourages damage from the vandal's knifing.

Below this canvas are spring

bands of corrugated, tempered steel, which together with the skeleton work, are also covered with protecting fabric. These bands are supported by spiral springs of special temper.

So that the cushion retains its original, comfortable shape year after year despite the hardest usage.

Hale & Kilburn seats will bear looking into!



## Hale and Kilburn Co.

Philadelphia   New York   Chicago  
Washington   San Francisco





# Current Collection with Miller Trolley Shoes Is

# CHEAPER

## Than with Trolley Wheels

The cost of collecting current by means of the Miller trolley shoe is less than with trolley wheels.

First, the brunt of the wear is taken by a steel contact piece which can be replaced at a trifling cost.

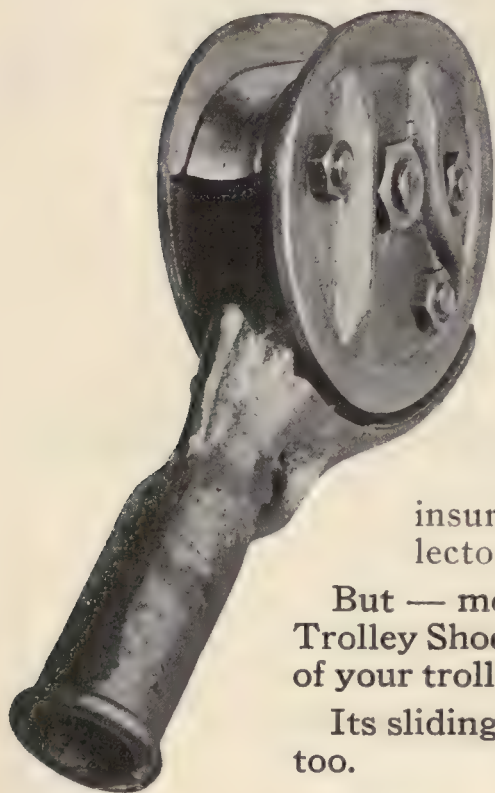
Second, the steel contact piece wears much longer than a wheel does in the same service.

Third, the sides between which the shoe and its copper shunt are held are subject to wear only at sharp curves. Hence the sides give several times the wear of the contact piece alone.

Fourth, the Miller shoe can always be used with less tension than a trolley wheel, insuring less wear on both collector and wire.

But — most important of all — the Miller Trolley Shoe does not save money at the expense of your trolley wire.

Its sliding, non-arcng contact saves the wire, too.



## MILLER TROLLEY SHOE COMPANY

53 State Street, Boston, Mass.

### SALES REPRESENTATIVES:

Holden & White—Chicago.

S. I. Wailes—Los Angeles, Cal.

W. M. McClintock—St. Paul, Minn.

W. F. McKenney—Portland, Oregon.

Alfred Connor—Denver, Col.

Chas. F. Saenger

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# Brooklyn Adopts Rico Coasting Recorder

The New York Municipal Railway Corporation, operating several hundred miles of rapid transit lines in Brooklyn and New York, has just placed an order for complete equipment of all its cars with Rico Coasting Recorders, after full approval by the Public Service Commission, First District, New York.

Thereby endorsing the principle that the true measure of the motorman's efficiency is not in the amount of energy used but in the way that he uses it as measured by the Rico Coasting Recorder.



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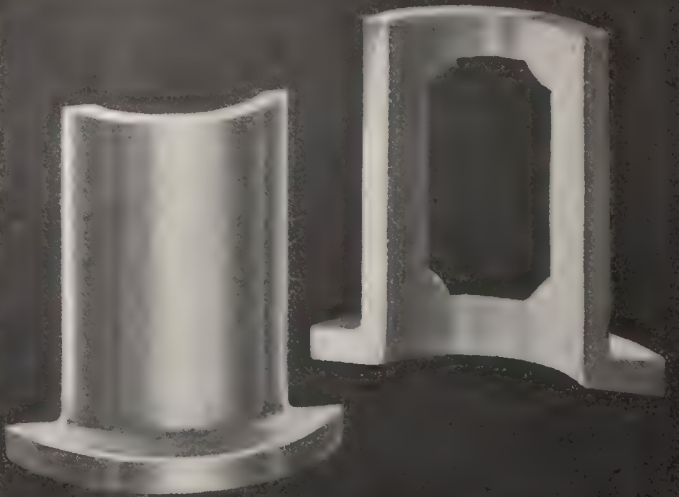
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MORE-JONES "TIGER" BRONZE AXLE and ARMATURE BEARINGS and CAR JOURNAL BEARINGS have an unbroken record for consistently reliable service. Their exceptional strength, toughness, durability and high anti-frictional quality have shown them to be the most economical bearings made.

MORE-JONES ARMATURE BABBITT METAL is specially designed for Street Railway Armature Bearing service in which it has proved particularly effective under the severest operating conditions. It is unusually long-wearing and eliminates much of the cost of rebuilding.

*Further information and prices on application*

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A good motorman is proud of his record.

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This otherwise-good-motorman may be wasting power because he has not been taught the possibilities and limitations of the equipment he controls.

Educate him in the principles of correct car operation. Show him how to accelerate—when to coast—how to brake. Above all give him a means of checking his efficiency.

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Economy Meters and Economy methods have solved this problem for dozens of big roads. Let us lay the results before you. Let us show you how to obtain this substantial economy with minimum expense and effort on your part.

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# And Still They Come Back for More Peter Smith Forced Ventilation Hot Air Car Heaters

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And have signified their approval by repeat orders. The reason? 50 deg. Fahr. throughout the car at all heating seasons—325 cu. ft. of fresh, warm air delivered every minute—at the insignificant cost of 28 cents per 18-hour day.

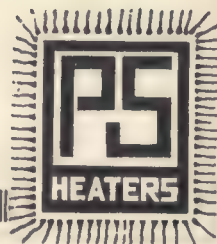
Ask for blueprints and data, and let the Peter Smith experts figure on your requirements.



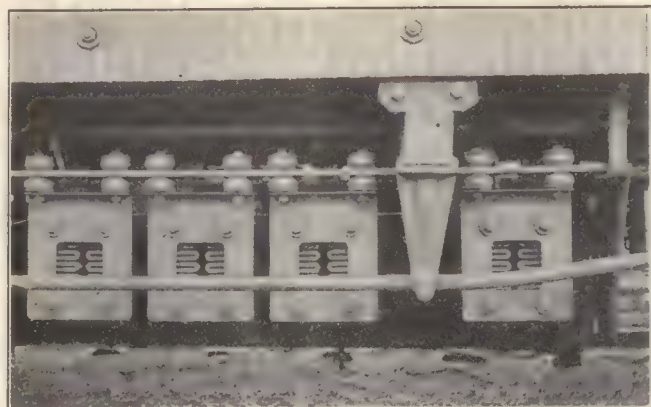
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Arrangement of Insulators, Frame and Grids on  
W.-B. & H. Railway

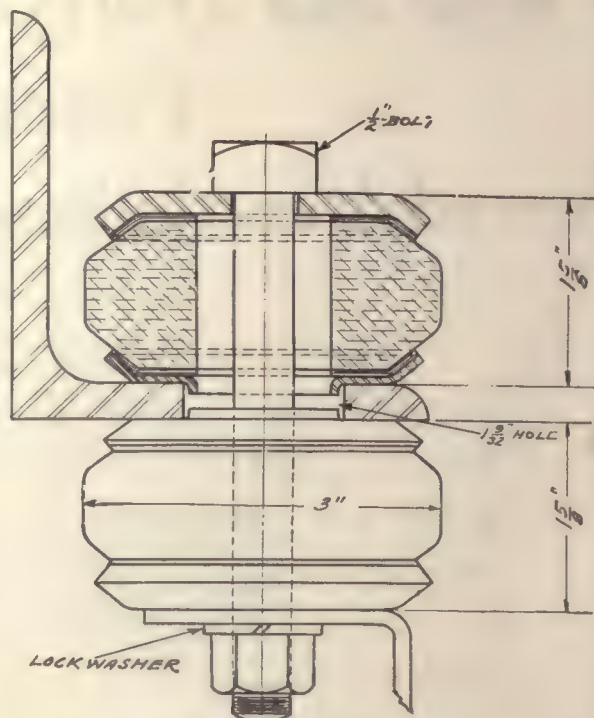


Diagram of Insulator on Car Rheostat

## 305,000 Miles at High Speed

on the interurban cars of the Wilkes-Barre & Hazelton  
Railway without breakage or leakage is the record of

## G-E Porcelain Bolt Insulators

These insulators have been in service for five years on six typical third rail, high speed cars of this road with entire satisfaction. Other roads have reported equally good results under all sorts of service conditions.

G-E Porcelain Bolt Insulators not only afford perfect insulation for rheostat grids, contactors, circuit breakers and fuse boxes but also are easily maintained since grease and dirt do not adhere to their glazed surface.

*Sample on application*

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For Michigan Business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.



# Electric Railway Journal

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No. 18

## SAVINGS BANK INVESTMENTS

Preparedness is the order of day, and the Investment Bankers' Association of America has not failed to do its share. Foreseeing the time when utility bonds will more generally join the select list of savings-bank investments, the association has outlined certain fundamentals that should aid state legislatures in framing new eligibility laws. The move is wise, for with the present low yields on many legal investments it is quite likely that savings banks will increasingly turn elsewhere to secure the necessary income, and the record of utility bonds entitles them to recognition first. Criticism can hardly be directed against the spirit of the proposed standards, for they are meant to insure only that fair margin of safety, that reasonable relation of property value to bond issues and that justified directness of lien which are demanded by sound financial policy. The real test of the standards, however, must come from their application to actual conditions, and here electric railways and other utilities have a double duty to perform. They should give to their financial reports the uniformity and clarity desired by investment bankers, and they should aid the bankers by applying the standards to their own bonds. If deserving issues are excluded thereby, the bankers want to be so informed, and their request should be granted without delay.

## ENCOURAGING FARE INCREASES

Three New England decisions authorizing fare increases above the 5-cent unit to 6, 7 and even 8-cent bases, as noted in the issue of Oct. 14 and elsewhere this week, are most encouraging evidence that the financial necessities of electric railways are becoming more and more appreciated by commissions. Two of these findings concerned interurban roads in New Hampshire serving Manchester, Nashua and Derry in close competition with the Boston & Maine Railroad. The third decision affected the Massachusetts Northeastern Street Railway, the rehabilitated "Lovell" system of the Merrimac Valley. In all these cases the commissions found that the companies were not earning anything like a fair return upon an honest investment, and that the requirements of depreciation as well as the rights of the security holders justified the proposed increases, since all three roads were found to be operated efficiently. Service rendered at a loss, or even at an income barely meeting running expenses and bond interest, was regarded as worthy of better compensation. It is interesting to note that in judging the fare units one commission drew a sharp distinction between the problems of the city road and those of the country or inter-

urban electric railway. Moreover, a very significant utterance is the one of the Massachusetts commission, which states that a company which has foregone dividends for a considerable period in order to provide adequately for maintenance, has an excellent claim for a return upon its common stock materially higher than 6 per cent. All in all, the decisions bear every evidence of thorough and courageous work on the part of the commissions, and indicate a sane understanding of electric railway economics.

## LOOKING TO THE FUTURE

Although in the last few years various commissions have granted increased fares to electric railways, as in the three recent instances above noted, the public as a whole is still far from being disabused of the idea that it is entitled to a fixed 5-cent fare, regardless of the rising costs of production. Especially is this true of urban transportation. For this reason we welcome every speech, decision or practice that tends to keep the concept of "cost" before the public mind, while at the same time we must deprecate all movements involving a neglect of this concept. In the latter regard a pertinent example is that of the abolition of the 8-cent exchange tickets under the proposed Philadelphia rapid transit ordinance, mentioned in the issue of Oct. 14. Some of these tickets may have been discriminatory, but on the average they probably no more than paid for the service rendered. The burden of their abolition may be lightened or removed by sinking fund and tax concessions, but the departure from principle is still there. In abolishing such tickets in the interest of a flat nickel fare, the proposed ordinance tends to disregard that fundamental cost principle which is certain to demand more open consideration in city transportation before the expiration of the fifty-year life of the ordinance. In this and other cases of outlining a transportation policy for years to come, it is hardly wise to allow present-day customs fully to restrict the future development of progressive ideas. It is as important to cities as to railways that the latter have at all times the assurance of an opportunity for untrammelled growth without having to pay for the privilege of serving the public.

## THE VEHICULAR TRAFFIC MENACE

It is noteworthy that at both the National Safety Congress, last week in Detroit, and at the Claims Convention, the week previous in Atlantic City, special attention was directed to the growing menace to safety in the streets from automobile traffic. With the Ford factory turning out cars at the rate of more



than 2000 per day and other factories in proportion, it is no wonder that the effects of traffic congestion are being found in our large cities. Another serious factor of the situation is that with such a multiplicity of cars, all degrees of recklessness in driving may be expected. Obviously the danger is not confined to any one class of occupants of the street. All are involved—the pedestrian, the local railway company and the users of all other vehicles. Hence, in its demand for some amelioration of this growing evil, the railway company is not acting alone. In this effort it should, and we believe will, receive the hearty support and assistance of all. The remedies are not so easy to enumerate, but some are obvious. They should begin with better control of vehicular traffic, stricter discipline of careless vehicle drivers, and more rigorous requirements for driver licenses. With these regulations there should be some means for reducing the parking evil in the more congested streets, forbidding the practice in many of them and possibly excluding automobiles entirely from the most congested streets, at least during certain hours. While, as we have said, all classes of the community are concerned in these reforms, the railways which are so vitally concerned can well lead the movement.

#### INTERURBANS IN THE LIGHTING BUSINESS

The sale of electric energy by interurban railways to the small towns along their routes, as outlined in our leading article of this week, has been demonstrated to be a thoroughly effective means for increasing revenue. Although the returns from any one community may appear at first glance to be petty, the aggregate may easily constitute an appreciable fraction of the railway company's income, and under proper conditions the business should be very much more profitable than transportation.

In the performance of this service an interurban railway has the primary advantage of an existing transmission system that frequently is supplied from a power station of considerable size, and it is therefore able to offer lower rates than a small local lighting plant. In addition, the influence of the diversity factor makes it just as logical for the interurban railway power station to supply small lighting systems as it is for large lighting and power companies to furnish energy for small railway properties. From the standpoint of theoretical economics, perhaps, the ideal arrangement would be that where a large power company extended a network of line to supply a whole district, including railways as well as the towns within a wide radius, as is done in western New York. But, unfortunately, such conditions are the exception rather than the rule, and there are many communities wherein the only source from which electric light and power may be obtained is either the interurban railway that passes through the town or a small and inefficient isolated central station. Of the two the railway is infinitely preferable.

Apparently, entry into such a lighting and power business is one of the easiest things that an interurban railway can do. All that seems to be necessary is to

express a willingness to supply energy and the community does the rest. There is, however, one feature that is worthy of careful consideration, and that is the making of rates. These must be in such form that, no matter what vagaries the all-important element of load factor may assume in the future, the business may always be conducted at a profit. At the present time, when many interurban railways have surplus generating capacity, it is possible for a company to make extraordinarily low rates and still show a profit. But such conditions will hardly obtain five or six years hence, and a company that undertakes long-term lighting contracts at low rates merely to dispose of surplus power that it happens to have immediately available is likely to be deceiving itself as to the future success of the enterprise.

#### USING REBUILT EQUIPMENT

The high prices and slow deliveries which have prevailed relative to new equipment of all kinds during the last two years have led many electric railways to rebuild and place in active service old rolling stock equipment that otherwise would have found its way to the junk pile. Old motors are heavier and less efficient and cost more to maintain than do new ones. Old cars, while they may, in some cases, be equipped with modern safety devices and made fairly presentable at a reasonable cost, after all are not as good as new. While the operating and maintenance charges, measured in cents per car-mile, are therefore higher for rebuilt than for new equipment, the use of rebuilt equipment for certain services may in some cases be justified from an economic standpoint.

This is particularly apt to be true for equipment used in rush-hour and special services on small and medium sized roads where the peak-load periods are of short duration. And the reason is high fixed charges, or charges such as interest, taxes, depreciation, etc., which go on accumulating whether the wheels turn around or not. For new equipment these charges, measured in cents per car-mile, are higher than one might expect. For example, on a \$4,500 car operated two hours per day at a schedule speed of 8 m.p.h., and with the sum of these charges assumed as 16 per cent of the cost, they are approximately two and one-half 5-cent fares per car-mile. And with the present interest and tax rates and rapid evolution in car design, 16 per cent for fixed charges is not by any means excessive.

In a steam power plant which is used in reserve service and carries load for only a few days in the year, economy in operation and low maintenance costs are of little importance as compared with low fixed charges. As with the reserve power plant so it is with rush-hour equipment, it being, of course, assumed that the matter of reliability always has due consideration. In any event, good engineering dictates that before a change of any kind is made, whether in the way of supplanting old equipment with new or of rebuilding the old, the costs entering into the proposed change should be correctly counted.



## What Is a Publicity Man?



W.J. ENRIGHT

### The Publicity Man Discussing Matters with the Public and the Press

**T**O make a rabbit pie it is first necessary to catch your rabbit.

It is the same with publicity; you must first catch the right man to make the campaign.

If you do not happen to have an embryonic E. H. Gary on your staff, a publicity man is most likely to be found in a local newspaper office.

But all newspaper men are not good publicity men.

A lot of disappointment has been caused by the hiring of reporter press-agents on the vague theory that they know the newspaper game.

Don't hire any man unless he has **ENOUGH SIZE AND WEIGHT** to make his superiors allow him to do the right thing in spite of their prejudices and previous habits in dealing with the public.

The publicity man who merely gives out what is handed to him by his boss isn't worth having around.

Neither is the man who thinks of his work only in the terms of what, from the newspaper point of view, is a good story.

The successful publicity man must have the corporation as well as the newspaper viewpoint.

And he must be big enough to be taken into and **MADE A PART** of a public utility organization. Just as much a part of it as the general counsel.

The worth-while publicity man must ask himself every day: What's wrong? What's right that people think is wrong?

What is complained of that is not our fault? How can I prove it?

And then he must prove it, and re-prove it and then prove it again.

He must plan, prepare the public mind for things to come and make the newspapers want to come to him before they go off half cocked.

These are some of the things that a publicity man is and must do.

He is not a miracle worker; he can't suppress news or put anything over on the newspapers.

He can't change hostile public opinion in a day.

But he can, if you will give him a chance, secure for any decently-conducted corporation a square deal from press and public.

**EVERY PUBLIC SERVICE CORPORATION NEEDS A PUBLICITY MAN IN ITS BUSINESS.**



# Selling Energy Along Interurban Railways

A Number of Interurban Roads Have Undertaken to Furnish Electric Power for Lighting and Industrial Use in Small Towns Along Their Routes—Invariably This Business Has Been Profitable and No Special Effort Has Been Required for Its Development and Continuance



INTERURBAN POWER SALES—TEN-KILOWATT FARM SERVICE SUBSTATION ON OHIO ELECTRIC RAILWAY

THE sale of energy for light and power by interurban railways to the communities that they serve has proved to be a desirable and profitable field of development, and at the present time it is being cultivated in all of the Central States. Although there has been some competition, the fact that the railway was initially serving the community has, in most instances, given it a special advantage in furnishing the additional service, and since the load carried at an interurban railway generating station frequently has no sustained peaks, the railway is in a better position to supply energy at low yet profitable rates than is a company designed only to furnish light and power.

Generally speaking, there is no difference of opinion as to the desirability and profitableness of energy sales by electric railways, but there is considerable disagreement as to how to go about obtaining this business. This is, perhaps, due to the fact that its development is comparatively recent. As a matter of fact the business depression of the past two years or more has awakened many managements to the great possibilities of supplying this profitable service in which a minimum investment is required. Contracts for supplying energy to wholesale and retail consumers vary from the plan usually followed by lighting and power companies, where energy is retailed to individuals. Instead, it is customary merely to supply a community or an industry from a tap to the railway transmission lines. Under the latter plan the consumer carries the entire investment charge, including the cost of transformation and the distributing plant, and the railway company agrees to furnish energy at a given potential when power is on the lines. Occasionally competition has forced the

railways to assume the cost of stepping down the potential to the consumer's distributing system, and in a few instances some companies have even been compelled to retail the energy to individuals in order to obtain the business. In any case, however, the rate is based upon the investment, transformer and line losses, and a proper proportion of the cost of delivering the energy to the high-tension lines.

Comparatively few companies have found it necessary to add to the generating capacity already provided to care for the railway peak loads. As a matter of fact, most companies have found that the sale of surplus energy for this purpose has tended to improve the load factor where sufficient business has been obtained.

The amount of such business contracted for by different railways produces a gross income varying from \$10,000 to more than \$500,000 per annum, and in some instances the lighting and power load at the generating station equals that used by the cars, the railway load on one property making up only one-third of the total output of the station. Where the energy is sold by a contract requiring no investment on the part of the railway, the ratio of profit in the revenue produced by the lighting and power business is large, but even where the rates include the proper allowances to cover fixed charges on the maximum demand, and the railway furnishes the substation equipment, the business has proved profitable.

## PRACTICABILITY OF 25-CYCLE ENERGY

To those who have not investigated the results that are being obtained through the sale of energy by electric interurban railway companies, there appears the



objection that energy cannot be furnished at 60 cycles. However, the slightly increased cost of motors and other electrical equipment designed for 25-cycle energy is practically negligible, and in so far as the undesirability of this frequency for lighting purposes is concerned it may be said that the opposite view is held by those who are now using it. Practice has shown that with close frequency regulation at 25 cycles there is no perceptible flickering with tungsten and nitrogen lamps.

In some instances, to close contracts for the sale of energy, it has been necessary for the railway company to provide a motor-generator set, or a frequency changer, but this requirement is rarely encountered. Where a community or a consumer assumes the cost of transformation and distribution, it makes little difference with the railway company what frequency is adopted. As a matter of fact, in a few isolated cases rotary converters have been installed and direct-current energy distributed to consumers. Obviously when such is the case no limitations are placed on the domestic appliances available to purchasers of power.

Another objection sometimes raised to an electric railway entering the power and lighting field is that this business would require the railway company's generating station to furnish a twenty-four-hour service instead of running only eighteen or twenty hours to carry the railway load. Some companies, of course, keep their generating stations in service twenty-four hours to move freight trains over the road during the night, but many of the stations are shut down from about 1 a. m. to 4.30 a. m. Where the latter situation exists it is provided for in the contracts with consumers of energy for light and power, and with the class of business the electric railways have been obtaining, this arrangement has not been found to be in any way objectionable.

Usually when this point is raised by prospective customers it is disposed of by simply calling attention to the low rates that apply to the railway power. In quite

a number of instances direct-current motor installations are served, energy being supplied from the trolley feeders, and such contracts, of course, are accepted only where the fluctuating voltage is not disadvantageous to the consumer.

Most of the contracts for energy for lighting and power purposes have been made with municipalities, although there are quite a number of large industrial consumers, and in a few instances individuals have made contracts with both the railway and the municipality to operate an independent lighting company. Where the municipality owns and operates the plant, the rates to the consumers are so fixed that the profit will be sufficient to pay the cost of street lighting, and in some instances, also, to pay for pumping the city water supply.

The rates to make this possible are generally calculated by the railway's engineers, and it is an exception to the rule when there is insufficient profit to provide a sinking fund as well as to pay for the street lighting. When energy is sold in this manner either to municipalities or private parties, the wholesale rates apply and the railway company has only one meter reading to make.

#### SPECIAL ORGANIZATION UNNECESSARY

Since most interurban railways companies are wholesale producers of energy for their own use, practically no special organization is required either to develop or retain a lighting and power business. It appears to be customary for the electrical engineer and his assistants to devote a portion of their time to supervising the lighting and power development, while the substation inspectors, ticket agents and attendants read the meters and collect the bills, this arrangement being perfectly feasible in small communities where the attendant is not required to leave his station for extended periods of time to read meters.

In the beginning the business of selling energy for power and lighting came to most of the electric rail-



INTERURBAN POWER SALES—TYPICAL OUTDOOR SUBSTATION FOR LIGHTING SYSTEM FOR TOWN OF 450 POPULATION



INTERURBAN POWER SALES—SUBSTATION FOR LIGHTING TOWN OF 800 POPULATION ON LINES OF T. H. I. & E.



ways unsolicited. Even at the present time many companies have adhered to a policy of not actively promoting sales, because it places them in a more favorable position when contracts are being negotiated. Also, many of the communities served by the interurban railways are so small that the available gross business does not warrant the expense of a special department for solicitation.

Aside from the increased revenue to be obtained, it has actually been found that the beginning of contracts for power and lighting has tended to improve public relations in the small communities; particularly so when the railway company's engineers see that the municipal plants are so engineered and the rates so fixed that they can be operated on a profitable basis. Obviously, the interurban railways brought the advantages of the city practically to the doors of the rural communities which they serve, and for them to supply energy for power and lighting to these communities is a thoroughly logical step.

#### PRACTICE OF AN IOWA RAILWAY IN DISTRIBUTING ENERGY TO MUNICIPALITIES

As an example of the experience and practice of an Iowa road it may be said that the Waterloo, Cedar Falls & Northern Railroad Company has developed, within the past year, a revenue of approximately \$1,000 per month from this source, the majority of the contracts

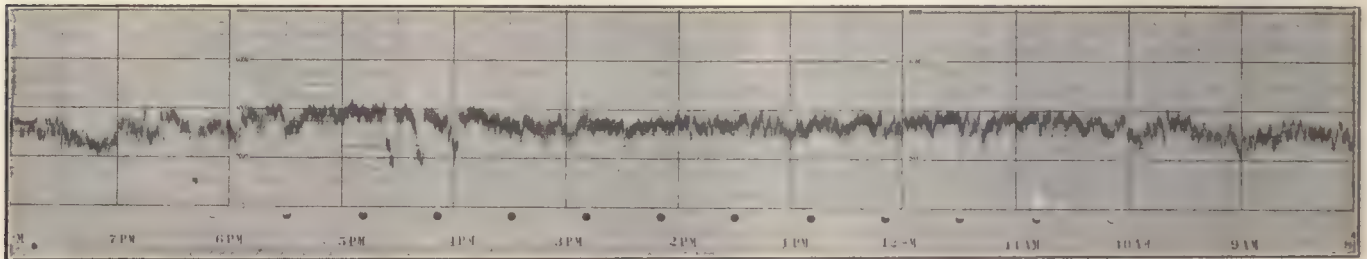
the number of industries in small towns and thus make them self-sustaining.

#### ILLINOIS TRACTION'S METHODS AND POLICIES

A gross revenue of approximately \$50,000 per year, received in amounts varying from \$50 to \$100 per month, is obtained by the Illinois Traction System, Peoria, Ill., through wholesaling surplus power to communities and industries along its lines, although some direct-current energy is retailed direct to grain elevators. Rates for various services have been standardized by this company and are essentially as follows: Direct-current for grain elevators is sold on a demand-and-energy schedule. The demand charge is \$3.50 per kilowatt and the energy charges range from 6 cents to 1¼ cents per kilowatt-hour. A minimum of \$1.50 per kilowatt of capacity per month is also charged. The wholesale demand charge for alternating current, both single and three-phase, is \$2.50 for the first 20 kw., \$2 for the next 80 kw., and \$1.75 for demands in excess of 100 kw.

To this demand charge is added a secondary charge for energy of 2 cents for the first 1000 kw.-hr., 1¼ cents for the next 3000 kw.-hr., 1½ cents for the next 96,000 kw.-hr., and 1¼ cents for all over 100,000 kw.-hr.

In a few instances three-phase alternating current is retailed for power purposes, and the following demand charges are applied: \$2 for the first 50 kw., \$1.50



INTERURBAN POWER SALES—TYPICAL DAILY LOAD CHART FOR

being for wholesaling energy to municipalities. As a rule the electrical energy for lighting is retailed by the municipality somewhere between 10 cents and 15 cents per kilowatt-hour, a power rate between 5 cents and 6 cents per kilowatt being made also. As an example, the village of Denver, having a population of 500, retails to about 100 consumers energy at 11 cents for lighting and 5 cents for power. The profit from this service pays for the energy used by a 30-hp. motor employed in pumping the village's water supply and for twenty-seven 100-watt street lamps. In the year of 1915 the village obtained a profit over and above all expenses of about \$400.

Under most of its contracts the railway company supplies the transformer equipment in the substation and the community or private corporation distributes the energy to consumers and steps it down where necessary at the distribution centers. Where the transformers are installed between substations the outdoor type of station is used with Burke horn-gap series-resistance lightning arresters with the gap set quite wide so that it arcs only in extreme surges. The experience of this company has demonstrated that when the gaps are close many of the disturbances that occur are really not necessary.

A charge of 8 cents is made for the first 100 kw.-hr. used monthly, 6 cents for the next 100 kw.-hr., and 4 cents for all energy in excess of 200 kw.-hr. This low rate attracts the retired farmer to the small town, the railway profiting by the increased population, and in addition the moderate charges have tended to increase

for the next 450 kw., and \$1.25 for all over 500 kw. A secondary charge for energy is added to this, amounting to 1½ cents for the first 7500 kw.-hr. used, 1¼ cents for the next 7500 kw.-hr., 1 cent for the next 85,000 kw.-hr., 0.9 cent for the next 100,000 kw.-hr., and 0.8 cent for all over 200,000 kw.-hr. These rates are applied only where the capacity exceeds 50 hp., and a minimum bill of \$1 per month is required. All contracts cover a period of five or ten years. The consumer is required to build lines satisfactory to the railway company and guarantee their condition.

Continuity of service for the lighting and power customers of the Illinois Traction System is insured by a loop transmission system, and practically no business is accepted off of such sections of the company's lines. This arrangement also insures good regulation and a special effort is made to maintain the frequency at least up to 25 cycles, so that there will be no complaints. While some farm service is supplied through privately-owned plants, the railway company has not found the demand sufficient to warrant the installation of transformer equipment to supply individual customers.

It has been found that no additional hazard has been created by taking on this lighting and power business, and that interruptions to the railway service have not been increased thereby. The character of line construction and the installation is supervised by the railway company, hence it is of a known standard. As a protection against interruptions arising from this source, however, a low-voltage automatic switch has been installed in connection with each lighting and power in-



stallation. Lightning protection on the 2300-volt side usually consists of a horn gap and choke coil. Electrolytic lightning arresters are provided on the transmission lines, but the small lighting and power installations do not warrant the use of such expensive protection. The horn gap and choke coil allows occasional interruptions, but these are not sufficiently serious to make the service unsatisfactory.

A twenty-four-hour service is furnished over the entire system because it is necessary to keep the power houses in operation during the night to move the sleeping cars and freight trains over the road. In fact, the power output for the entire twenty-four-hour period is practically a straight line. The demand falls off somewhat about 6.30 p. m.; hence, if the amount of energy sold for lighting were large it would actually tend to improve the generating station conditions between that time and midnight.

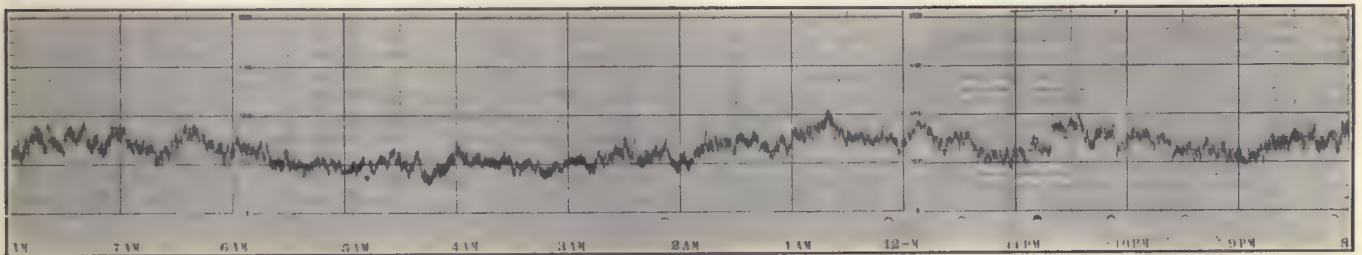
#### METHODS OF TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

The Terre Haute, Indianapolis & Eastern Traction Company is selling direct current and alternating current both three-phase and single-phase to municipalities, large industries and to a few individual consumers. At the present time this company is selling approximately 70,000 kw.-hr. per month, and it obtains a revenue of approximately \$2,000 a month. The retail rates are as

period of less than five years. As a rule, under these special contracts, which are termed off-peak-load contracts, the railway company installs the necessary transformers and other equipment.

For the development of this lighting and power business the superintendent of distribution and substations keeps in touch with prospective customers through his division foremen and by occasional personal calls. With the permission of the management he is frequently appointed the engineer for the municipality, prepares the plans and specifications, and inspects the completed installations, which, as a rule, are put in under contract. This arrangement has been found very satisfactory, because the municipality pays the company's engineer for his work and, at the same time, the engineer is in a position to see that an installation is provided that is satisfactory to the railway company as well as to the community. It tends also to bring the railway representatives into close personal relations with the community, which also redounds to the company's future good.

In practically every instance where the railway has contracted with a municipality to furnish energy for lighting and power purposes, the municipality has paid the entire cost of the installation including the transformer equipment, but excepting the cost of the tap to the transmission line. These contracts also do not provide for a twenty-four-hour service. As a rule the maxi-



RIVERTON POWER STATION OF ILLINOIS TRACTION SYSTEM

follows: Up to 25 kw.-hr. per month a charge of 10 cents per kilowatt-hour is made; for from 25 to 50 kw.-hr. per month a charge of 9 cents per kilowatt-hour is made, and the charge for 50 kw.-hr. or more per month is 8 cents per kilowatt-hour. A cash discount is allowed for payment before the tenth of the month, which begins with 5 per cent for amounts less than 100 kw.-hr., with an increase of 5 per cent in the amount of the discount for each increase of 100 kw.-hr. per month from 100 kw.-hr. to 600 kw.-hr., and a further graduated increase in the discount in 200 kw.-hr. steps from 600 to 2000, where a discount of 50 per cent is allowed. In connection with these rates a minimum of 50 cents per rated horsepower per motor is charged, but in no instance is the minimum charge per month less than \$2 for any one installation.

Wholesale energy rates are based on a yearly guarantee. Thus, a purchase of \$500 per year gross receives a rate of 4 cents per kilowatt-hour; a purchase of \$1,000 per year receives a rate of 3½ cents per kilowatt-hour, and \$1,500 per year gross receives a rate of 3 cents per kilowatt-hour. Aside from these wholesale and retail rates, special contracts are made with large industries based on the maximum demand. There is charged a rate of 1¾ cents per kilowatt-hour for the first 5000 kw.-hr. per month, 1.6 cents per kilowatt-hour for the second 5000 kw.-hr. per month, and 1.5 cents per kilowatt-hour for all over 10,000 kw.-hr. per month. A readiness-to-serve charge of \$1 per kilowatt per month is added, and no contract is accepted at these rates for less than 100 kw. of maximum demand for a

minimum time during which the energy is off the line is between 1 a. m. and 4.30 a. m. In addition to carrying the investment charge on the transformer equipment, the community is charged for the transformer core losses, while the railway assumes the cost of the copper losses. The fact that the transformer core losses will in most cases amount to a great deal more than the revenue for energy sold during the period that the power is off the lines, furnishes an excellent argument against all-night service in small communities.

Incidentally, it has been this railway's experience that consumers in the small villages along its lines buy electrical service from municipal plants more readily than they do from privately-owned plants. The success with which these municipal plants are meeting perhaps is best evidenced by producing facts from their annual statements. A municipal plant was completed and put in service on Dec. 23, 1915, at Lewisville, Ind., a village of 450 population. On Aug. 1, 1916, 100 meters had been installed, although there are only 125 houses in the town. The village of Advance, Ind., with a population of 416, has installed 105 meters and collected a gross revenue of approximately \$1,500 for the year 1915. The total cost of this municipality's plant was approximately \$7,500, and the amount paid to the railway company for energy was, in round figures, \$640. The difference between the collections and the amount paid the railway company, which included the energy used by twenty-two 150-watt and 250-watt street lamps, left \$860 with which to pay interest on the investment. The village of Coatesville, Ind., with a population



of 470, has 165 consumers which produced a gross annual revenue of \$2,185 in 1915. After deducting the amount paid the railway and that spent in maintaining the system, approximately \$620 was left with which to pay interest on a plant costing approximately \$5,700. The village of Centerville, with a population of 800, has 187 consumers which produced an annual revenue of \$2,160 in 1915. The expense of operation, including the cost of energy purchased from the railway and the current consumed by thirty-three 100-watt and 200-watt street lamps, was \$2,040. The plant in this instance cost, in round figures, \$7,450.

The equipment installed for these light and power installations, either in the company's substations or where the current is taken direct from the high-tension line, is standardized as far as the requirements of the community will permit. When energy is supplied from a substation, the secondary voltage is usually stepped



INTERURBAN POWER SALES—EQUIPMENT IN INDIANA SHALE QUARRY OPERATED BY D.-C. MOTOR ON INTERURBAN TROLLEY CIRCUIT

up to 2300 volts by small transformers, located, as a rule, outside of the station. In some cases, however, where the substation is located within the town, the secondary voltage of approximately 370 volts is stepped down to 220 volts, or 110 volts by transformers outside the substation, and distributed by a three-wire system.

#### RESULTS ON OTHER INDIANA RAILWAYS

The Union Traction Company of Indiana also is furnishing energy for light and power to twenty-six municipalities, varying in size from 200 to 1500 population. Through a subsidiary company franchises have been obtained in twenty-three of these towns for retailing energy to individual consumers. In two cases the energy is sold wholesale to municipalities, and in another it is sold to private corporations which distribute to the individual consumers. The gross revenue obtained from this source is about \$45,000 per year.

The Fort Wayne & Northern Indiana Traction Company and its subsidiary, the Wabash Valley Utilities Company, which distributes to communities not located on the interurban railway divisions, has developed the sale of energy for light and power purposes until it receives a gross income of approximately \$500,000 a year. This energy is sold outside of Fort Wayne and La Fayette to communities varying in size from 200 population up to more than 2000. Energy is sold at an established rate of 10 cents per kilowatt-hour for lighting service, and power rates vary, dependent upon the demand, down to as low as 2 cents per kilowatt-hour. This company furnishes a twenty-four-hour service to all consumers, because its plants are in operation for that period to supply energy to Fort Wayne and La Fayette for lighting and power purposes.

The Indianapolis & Cincinnati Traction Company supplies energy to eleven lighting plants in small towns and villages, and a number of motor installations in grain elevators are supplied at 3300 volts direct from the single-phase trolley. In all cases but one this company deals direct with the consumer, and it installs the transformation and distribution systems. A retail residence lighting rate is made to all communities as follows: Ten cents per kilowatt-hour for all energy up to 25 kw.-hr. per month, and 8 cents per kilowatt-hour for all energy in excess of 50 kw.-hr. per month. A minimum charge of \$1 per month is made to all consumers, and a discount of 1 cent per kilowatt-hour is made to all those who pay within the ten-day period. The special rate for power is as follows: Energy used up to 100 kw.-hr. per month is sold at 7 cents; 100 kw.-hr. per month and less than 300 kw.-hr. is sold at 6 cents; 300 kw.-hr. per month and less than 500 kw.-hr. is sold at 5 cents; 500 kw.-hr. per month and less than 1000 kw.-hr. is sold at 4 cents, and 1000 kw.-hr. per month and over is sold at 3 cents. In connection with these rates a cash discount of 5 per cent is allowed on all bills if paid within ten days after the meter reading date, and a minimum charge of \$1 is made for any installation.

#### PRACTICE OF WESTERN OHIO RAILWAY

Undoubtedly the most extensive sales of energy for light and power made by an interurban railway in the Central West are those of the Western Ohio Railway Company, whose railroad load makes up less than 50 per cent of the total. The output of energy for power and lighting purposes is about 2,500,000 kw.-hr. per month, one customer taking approximately 1,000,000 kw.-hr. per month. The question of rates for energy is regulated by the State Public Utilities Commission, and most of the energy is sold to individual consumers. Even though the amount of energy sold for lighting and power is greater than that used by the railway, this company has no special organization for soliciting or maintaining it. Generation is under the supervision of the electrical engineer, and the distribution and development is taken care of by the superintendent of overhead lines.

This company does not encourage the use of direct-current motors, because of the marked fluctuation in the trolley voltage due to the heavy freight service. In practically all cases energy is supplied at the standard voltages, single phase or three phase. Where it is necessary for the railway to operate the plant as a light and power company in order to obtain the business, it does not hesitate to make a contract; but where the energy can be sold to the municipality wholesale, or to a private corporation, this is also done. Competition in the territory served by the Western Ohio Railway has been rather keen in some localities, hence it has been



necessary to adopt this broad policy regarding the service. Energy is retailed in eight small towns at 25 cycles, but in some of the larger cities, particularly where old plants have been displaced, it is necessary to supply the energy at 60 cycles. Practically all of these contracts are made for a period of ten years with an option for renewal, and a twenty-four-hour service is furnished. It is also interesting to note that while most other railway companies have not extended their transmission lines beyond their rights-of-way, this company has two branch transmission lines, one seven miles in length and the other five miles.

Although this company generates energy at a single power house, interruptions to the lighting and power service are comparatively infrequent. The reliability and continuity of this service are maintained at a high standard by careful and frequent inspection of all the transmission lines, and especially the insulators.

Rates for power and commercial lighting range from 4 cents down to 2 cents net per kilowatt-hour, the latter applying to customers using more than 3000 kw.-hr. per month. There is no monthly minimum charge. For domestic or residence lighting the rate ranges from 8 cents net per kilowatt-hour down to 3.5 cents, with a minimum charge of \$1 per month. Wholesale rates to electric railroads or resale companies with a connected load of 100 kva. or over, range from 2 cents per kilowatt-hour down to 1.1 cents when more than 450,000 kw.-hr. are used.

#### RATES OF OTHER OHIO ROADS

Energy is supplied to eighteen towns and villages, and a number of other manufacturing and individual customers along the lines of the Ohio Electric Railway. The total amount of energy sold during the month of June, 1916, was 128,283 kw.-hr., the maximum to any one customer being 26,550 kw.-hr., and the minimum 690 kw.-hr. Three schedules of rates have been promulgated, namely, a wholesale rate for villages where there is a single installation of 25 kw., a wholesale rate to villages where there is an installation of 50 kw. or over, and a retail rate to small communities where the railway company provides the distribution system and sells direct to the consumer. Where the village is incorporated the energy is sold to the village authorities, but where it is unincorporated energy is sold direct to the consumers. In a few instances a rural lighting and power business is being developed by paralleling the railway's overhead lines with a 440-volt or 220-volt single or three-phase line mounted on the same poles. One 12-mile installation of this kind has worked out very satisfactorily.

The rates for the three classes of service furnished by this railway are as follows: Where there is a single installation of 25 kw., for the first 100 kw.-hr. consumed the rate is 8 cents per kilowatt-hour, and this ranges down to 4 cents for amounts in excess of 1000 kw.-hr. There is a minimum charge of \$50 per month. For an installation of 50 kw. or over the charge is \$1 per kilowatt of transformers installed plus 2 cents per kilowatt hour. There is a discount allowed on bills if paid before the fifteenth of the month. On bills of \$400 or less per month this amounts to 5 per cent, and it ranges up to 20 per cent on bills over \$500 per month. The schedule for retailing current in small communities includes a rate, for the first 30 kw.-hr. consumed, of 10 cents per kilowatt-hour, and this ranges down to 4 cents for amounts in excess of 1000 kw.-hr. There is a minimum charge of \$1 per month.

Where energy is wholesaled to municipalities or individuals the railway pays the cost of installing the transformers and the meters, and the consumers pay the

cost of the distribution system. Except for the lines east of Columbus, Ohio, a twenty-four-hour service is furnished on all contracts for lighting and power. On some of the railway lines, where a twenty-four-hour service was not originally in effect, special arrangements were made to render service during this period in order to obtain the business. Experience has shown that as a rule the twenty-four-hour service only requires a small machine to take care of the load, and this may be operated economically and without adding materially to the cost of the service. In summing up the business on the lines of the Ohio Electric Railway, it can be said that the lighting load has had the effect of improving the generating-station load factor. This is not true, however, of the power load, which is principally a day load. On the other hand, the lighting and power business has been found to be both desirable and profitable and well worthy of intensive cultivation.

Another of the interurban lines operating in Ohio which sells a proportionately large amount of energy for power and lighting is the Cleveland, Painesville & Eastern Railroad Company. In round figures, 15 per cent of this company's gross income, or about \$75,000 per year, is obtained from power and lighting sales. Its total output averages from 175,000 kw.-hr. to 200,000 kw.-hr. per month, with one customer requiring about 60,000 kw.-hr. This company's consumers include municipalities, private corporations and individuals, and it has adopted the policy of paying for all transformers and meters, and it makes house connections free of charge where they are within 150 ft. of the distribution lines. It has also been the policy to pay for all extensions, providing there is a sufficient amount of business to warrant so doing, but energy is not refused where the consumer provides the distribution system. At the present time the lighting and power load makes up about 20 per cent of the total load carried by the railway company's power station.

A schedule of rates providing for wholesale and retail light and power customers has been filed with the Public Service Commission. Essentially the rate to light consumers is 11 cents per kilowatt-hour, with a discount of 2 cents per kilowatt-hour if paid within ten days after bill is rendered. Power rates range from 5 cents to 1¾ cents per kilowatt-hour with a minimum charge of \$1 per horsepower per month.

#### New York Association Appointments

J. P. Barnes, president New York Electric Railway Association, has made the following committee appointments for 1915-1916:

Committee on standards: W. G. Gove, chairman; J. S. McWhirter, W. J. Harvie, B. Penoyer, J. P. Ripley.

Committee on military operation: W. C. Fisk, chairman; J. E. Hewes, J. J. Dempsey, George V. Snyder, J. S. Kineon.

Committee on membership: J. E. Hewes, chairman; B. A. Hegeman, H. N. Ransom, J. J. Dempsey, W. H. Collins.

Committee on taxation and rates of fare: W. H. Collins, chairman; C. F. Hewitt, Thomas Penny, J. H. Bennington, J. H. Pardee, R. L. Rand, Ralph Norton.

Committee on compensation insurance: E. A. Maher, Jr., chairman; C. F. Hewitt, C. L. Stone, C. S. Banghart, W. H. Collins.

Committee on public relations: J. K. Choate, chairman; Frank Hedley, E. A. Maher, Jr., E. G. Connette, L. S. Storrs.

Committee on safety rules: B. Penoyer, chairman; F. A. Bagg, C. A. Brooks.



# Utility Bonds for Savings Banks

Committee of Investment Bankers' Association at Recent Convention in Cincinnati Suggested Certain Legal Standards for Utility Bonds as Savings Bank Investments—  
Co-operation of Utility Managers Asked in Applying Tests to Particular Issues

THE work of the public service corporations committee of the Investment Bankers' Association of America during the last year, as reported to the fifth annual convention of this association in Cincinnati, Ohio, on Oct. 1-4, was largely taken up with the consideration of provisions for a proposed savings bank law covering investment in public utility bonds. In presenting the report Chairman John E. Oldham, of Merrill, Oldham & Company, Boston, Mass., stated that the committee was not making definite recommendations, but rather suggestions, which were subject to further study. If the provisions were acceptable to the association the committee would be glad to have public utilities test their bond issues thereby, and it would then give further consideration to the question, if necessary, so as not to bar out issues that ought to be included among permissible savings bank investments. The main sections of the report, which was approved by the association, and a few points brought out in the discussion thereon, are presented in abstract in the following paragraphs.

In the early deliberations of the committee it became apparent that no single law could be drawn which would be adapted to conditions in all states. It is true that the requirements and purposes of savings banks, wherever located, appear to be much the same, the aim being to invest small savings safely and pay depositors dividends at the rate of 4 per cent annually. In general, the average expense, including taxes, of running savings banks amounts to about three-fourths of 1 per cent of the deposits, and an additional one-eighth to one-fourth of 1 per cent is desired for the purpose of a reserve. To pay dividends of 4 per cent, therefore, requires an average return on investments not far from 5 per cent.

The opportunities for investment in different states, however, vary to such an extent that the methods of obtaining a 5 per cent return also show considerable variation. In some states 50 to 60 per cent of savings bank assets are found to be invested in real estate mortgages and personal loans. As these investments usually yield fairly generous returns, such long-term securities as are purchased can be of a kind to yield a lower income return than would be the case if the yield from the bulk of the investments was not so large. In states of slow industrial growth, however, where few new enterprises are being developed, opportunities to invest in local real estate mortgages and personal loans are often very limited, and it therefore becomes necessary to seek among other forms of investment something which will produce income enough to bring up the

general level and permit a 4 per cent dividend rate for the depositor. Situations of this kind, in the opinion of the committee, apparently provide the most favorable field for the introduction of well-secured public utility bonds to savings bank investment, inasmuch as such bonds are adapted to yield the desired income and furnish the necessary requirements of safety and marketability. The committee undertook, therefore, to make suggestions for situations of the latter kind, leaving a law for the other to be considered at some future date.

## SUGGESTED STANDARDS

Gross earnings of at least \$500,000.

Gross earnings equal to four times fixed charges.

Net earnings equal to one and three-quarters times fixed charges.

Investment restricted to utilities in states having commission regulation.

Bonds in general secured by direct lien on operating property.

## A REQUEST

"The committee would be glad to have utility managers use its tests on particular bond issues and see how they would qualify. If it finds in actual practice that it is barring out securities that should be eligible, it must see if it cannot word the law so as to include every issue that should legitimately come in."

## RELATION OF PROPERTY VALUE AND EARNINGS

In the first place, the committee stated, it will be generally agreed that the face value of the securities proposed to be made eligible for savings bank investment should not exceed the investment value of the property, and that net earnings should exceed the amount of interest charges. While property values and gross and net earnings may appear at first sight to be unrelated, and while, of necessity, there can be no definite and fixed relation which will apply alike in all cases, yet, as both gross and net earnings are so largely determined by rates for service per-

mitted by regulating commissions, and as the investment value of a property is so important a factor in determining rates to be allowed, the committee felt that there is some kind of relationship, and some conclusion as to this relationship must be reached and recognized before undertaking to work out the provisions of a law of this kind. In using the term "investment value of property" the committee had in mind the probable value which will serve as a basis in making rates for service, which, under average conditions, would doubtless be less than the fair market value of the property.

From an examination of a large amount of railroad statistics, public utility appraisals and various rate decisions, it appears that there is little reason to expect a rate basis substantially in excess of an investment of \$5 for \$1 of gross earnings. It is seldom that a value is accepted which exceeds this amount, and more often the relation is \$4.50 to \$1, or \$4 to \$1. The committee believed that a large number of the cases where property investment exceeds five times gross earnings will fall under one of two heads. Either rates are low compared with companies operating in similar circumstances, and the company does not receive the gross earnings to which it is entitled for the amount of investment; or the investment, although made in good faith, fails to realize the results which were anticipated in the way of obtaining business. In the former case, readjustment of rates to a higher level by commissions or



otherwise tends to bring the ratio of earnings and investment to that stated. In the second case, however, if sufficient business does not exist to justify the investment, rates on the business which does exist cannot fairly be raised to a point to yield a return on the entire property even if it were practicable to obtain the business at such rates. As the company will probably be obliged to operate under a scale of rates similar to those of companies whose investment represents only \$4 or \$5 to \$1 of gross earnings, it will be most difficult to obtain a return on the excess of investment, and as the excess investment cannot earn a return and probably will not be recognized for purposes of rate-making, the value of the property to all intents and purposes is reduced to the average level.

#### CALCULATING THE MARGIN OVER FIXED CHARGES

In cases where commissions have been called upon to determine the rate of return on the investment, they have usually reached conclusions that 6 to 8 per cent was reasonable. If this conclusion is applied to the relationship between gross earnings and investment, as noted above, the amounts necessary to give a 6 to 8 per cent return would require a sum equivalent to between 24 per cent and 40 per cent of the gross earnings. That is, a 6 per cent return on a property value of four times the gross earnings would give 24 per cent of the gross earnings. Eight per cent on five times the amount of gross earnings would give 40 per cent of the gross earnings. It appears from this that from 32 to 40 per cent of gross receipts would be the maximum amount to be expected as an allowance for a return on invested capital where companies are under the supervision of a commission.

From the foregoing, the committee said, it appears that the limit to which money may be loaned upon property must be safely within the amount of four or five times the gross earnings of the property and that the fixed charges must be safely within an amount of from 32 to 40 per cent of the gross earnings. The relationship of the amount of the loan to the property value will be apparent from the amount of bonds, and the relationship to earnings will be apparent from the amount of fixed charges. As the charges bear a fixed relation to the amount of bonds, they may be taken as the starting point in the establishment of standards for such purposes as the proposed law. They may be measured in their relation to net earnings representing a basis of earning power, or in their relation to gross earnings to show indirectly the relationship of bonds to the value of property.

If a sufficient margin of net earnings over interest charges were the only requirement, the committee observed, it might occur that this margin was obtained as the result of abnormally high rates for service, abnormally low wages or power costs, or insufficient maintenance of the property. In these cases the net earnings might be obtained from gross earnings on a smaller investment than would warrant the amount of bonds indicated by fixed charges. If investigation were made by a commission, net earnings might be allowed only on such investment, which would not give enough of a margin over fixed charges. Or the advantage from low operating costs might disappear as conditions changed, and the margin be dangerously reduced from this cause.

Large net earnings resulting from a low operating ratio were said to indicate either more than an average investment on which the usual return is allowed, or an abnormal rate of return on what is recognized as an average investment. An abnormal return on invested capital would not be likely to continue indefinitely but would result in agitation for lower rates for service,

which, if brought about, would be followed by a decrease of both gross and net earnings. The final result would then be to establish a relation of earnings to property investment such as is found under average conditions. On the other hand, if the relationship of fixed charges to gross earnings, as showing the relation of bonds to property value, should be taken alone, a generous margin of value over bonds might exist, but the property might be burdened with heavy expenses which would leave net earnings entirely insufficient to provide a safe margin over charges.

#### BOTH GROSS AND NET EARNINGS MUST BE CONSIDERED

After consideration and experimenting, the committee decided that net earnings equal to one and three-quarters times fixed charges offer a fair margin of safety and that gross earnings equal to four times fixed charges offer sufficient evidence of a property value in fair proportion to the amount of bonds.

It is necessary, however, to combine these requirements as a check upon each other. For instance, in the case of a property with \$100,000 of gross earnings the value might be \$500,000. If it were bonded for this entire amount, the fixed charges would be \$25,000, and the requirement that gross earnings should be four times the fixed charges, would be met. To show one and three-quarters times these charges, however, would require \$43,750 of net earnings applicable to a return on capital and allowance for depreciation. This is not an uncommon proportion of net earnings to gross; and yet if the company were involved in a rate case before a commission, it would probably not be allowed in excess of 6 to 8 per cent return on \$500,000 investment, or only from \$30,000 to \$40,000, which would not provide a sufficient margin over the \$25,000 fixed charges to comply with the requirement.

On the other hand, the committee cited the case of a company with \$100,000 of gross earnings operated for 44 per cent and having \$56,000 of net earnings. This, at a ratio of one and three-quarters to one, would justify \$32,000 of fixed charges, equal to 5 per cent on \$640,000 bonds, an amount probably in excess of any property value which the commission would find. Gross earnings, however, would not be four times the charges; consequently, such bonds could not qualify.

While situations may exist, because of special circumstances, where a return may be allowed on more than average investment value, or the rate of return allowed may be above the average, at the same time the committee believed that in drafting a law of this kind it should have in mind average and not special conditions. The restrictions suggested would guard against investments based on excessive property values unaccompanied by necessary earning power both gross and net. The provisions for gross earnings would be a protection against larger net earnings than could probably be maintained, and the margin between net earnings and fixed charges would provide against decrease in net earnings due either to falling off of business, reduction in rates, increase in cost of operation or other unforeseen causes.

#### KINDS OF UTILITIES TO BE ELIGIBLE

In regard to the kinds of utilities which afford a suitable field for savings bank investment, the committee felt that it is advisable, for the present at least, to include only companies furnishing artificial gas, electric light and power, local transportation and telephone and telegraph service. It was suggested that the recent development of the jitney and other independent



systems for local transportation makes it desirable to specify in the law that local transportation companies must operate cars running on tracks. Furthermore, it was not deemed sufficient for the purpose of savings bank investment that the corporations whose securities are made eligible should be engaged in the kinds of business above designated—they must be engaged in them in a really public way. The earning power needs to have the stability afforded by an income derived from the general distribution of service. A power company selling its entire product to a few large manufacturing concerns would not come within the requirements of the law as proposed.

The committee, after some study of various utility properties and the market for their securities, suggested that companies must have at least \$500,000 of gross earnings in order that their securities may qualify for investment. It was believed that this figure fairly marks the point where the advantages of a well established market for the securities of a corporation may be expected to exist. The committee also suggested, in order that there may be assurance that earnings are derived from a general distribution of service, that if 10 per cent or more of the gross earnings is derived from any one customer, the revenue from that customer shall be excluded in determining the size of the corporation. It is not the intent, however, to exclude these earnings in the other provisions of the law. The committee proposed that investment should be limited to companies located within the United States, and it believed that investment can to advantage be further limited to those states which have public utility commissions with powers of protection of utilities and their investments.

The committee was of the opinion that it would be unwise to try to draft definite provisions in regard to franchises. To require that all franchises should extend beyond the life of the bond would disqualify some of the best securities, and possibly place in a doubtful position corporations operating in states providing for the so-called indeterminate franchise. To require that the principal franchise should extend beyond the life of the bond would raise the difficult question as to what the principal franchise of a particular corporation is. The committee believed, therefore, that in limiting investment to the securities of corporations operating in those states which have public service commissions with jurisdiction over rates and requiring a certificate of public convenience and necessity, it had done as much as is practicable in the form of a general rule in safeguarding investment against franchise difficulties.

#### DEFINING FINANCIAL TERMS

It appeared best to the committee to adopt a principle which would limit the proposed investments to the securities of operating companies except as further noted, and only to those securities which possessed a direct lien on property operated in the service of the public. This would insure that the earnings on which the restrictions were based should come directly from the operation of a utility, rather than in the form of interest or dividends, and that in case of trouble the security holders could at once take possession of the operating property.

This led to the proposed definition of gross earnings as income received from properties owned and operated, or leased and operated (intercompany items excluded). In some cases the earnings of properties controlled (by stock ownership) and operated, might be so merged in a company's statement of gross earnings as to make their inclusion necessary, and it is possible that some provision should be made for situations of this kind.

This, however, is open to the objection that securities issued by a company which merely controls its subsidiaries, usually can give a lien only upon their securities and not upon the properties, and therefore do not meet the requirement calling for a lien upon actual property used in operation. It is possible, however, that it may be advisable to make provision for companies owning the entire amount of securities of operating companies and pledging the same as security for bond issues in such a way that in event of foreclosure the property could be reached as effectively as if secured by direct mortgage.

With regard to net earnings, these were defined by the committee as "the amount remaining after deducting from gross earnings the amount of operating expenses (including therein expenses of reasonable and proper repairs, current renewals and maintenance, license charges, taxes and insurance) for all properties, the income from which is included in gross earnings." The committee said that it might be open to discussion what should be the exact wording of this definition, particularly with regard to maintenance and possible provision against depreciation. Moreover, it believed that there might properly be added to this definition a provision for the inclusion of income from outside sources, such as securities owned. An objection to this would be that bonds could be issued on the basis of net earnings which might come from other than public utility operation, but the required ratio between gross earnings from operation and fixed charges would act as a check to prevent a company from taking advantage of this provision except to a small extent.

Fixed charges in a general way were said to include all interest paid upon the direct and assumed obligations of a company and all rentals paid, whether in the form of cash payments or dividends or interest on securities of leased properties. These charges, however, include such payments only when made outside the company and do not include interest or dividends on securities held by the company itself.

#### SECURITIES THAT WOULD QUALIFY

The committee suggested, as before stated, that in selecting the securities of companies which qualify for investment, the principle should be followed of allowing only bonds which are secured by a direct lien on operating property from which the company's gross earnings are derived, and are the direct or assumed obligations of the company which qualifies or are bonds of leased and operated properties guaranteed as to both principal and interest by indorsement by such a company. This limits investment to mortgage bonds except that the committee believed that an exception may safely be made in the case of a bond issue secured by entire issues of first mortgage bonds of operating properties whose gross earnings are included in a company's statement of gross earnings, as such an issue would give in effect a first lien on operating property.

With the above exception the eligible classes of bonds recommended by the committee would be either first mortgage bonds, refunding mortgage bonds or bonds underlying a refunding mortgage. No minimum amount was thought necessary as to the size of a bond issue to qualify under the law. First mortgage bonds would have the requirement of having been secured on all the property of the issuing company at the time of issue (though not necessarily secured by a first mortgage), and of being secured by a first mortgage on this property at the time of investment (though not necessarily on the entire property of the company at that time). Refunding mortgage bonds would be secured by a mortgage on all the property of the company at the



time of issue, would provide for the payment at maturity and retirement of all underlying bonds and would mature at a later date than any of such underlying bonds. It was also thought best to require that the amount of additional bonds issued under the refunding mortgage shall be at least equal to the amount of underlying bonds. The inclusion of refunding mortgage bonds makes it logical to include also the bonds underlying such refunding mortgage. Some of these may already qualify as first mortgage bonds, and as those which do not are acknowledged by the company creating the refunding mortgage as prior obligations and are to be replaced by bonds qualifying as legal, it seems reasonable to include them as eligible.

In addition to the bonds already considered, the committee discussed the senior bond issues of companies whose junior issues would not qualify. It suggested the inclusion of first mortgage bonds of such companies which conform in their fixed charges (interest on first mortgage bonds plus rentals of the company) to ratios of 1 to 5 and 1 to 2 with the gross and net earnings respectively. The committee also recommended the inclusion of refunding bonds on similar terms for companies not complying with the credit requirements.

#### MISCELLANEOUS REQUIREMENTS

The committee suggested that where for the purposes of the law a certain ratio of earnings to fixed charges is required, this ratio must have existed in the three fiscal years of the company next preceding investment. The requirement as to amount of gross earnings, however, need have existed only in the fiscal year next preceding investment.

It was believed that a provision should be included similar to that in some existing savings bank investment laws, permitting a company's securities to remain legal although the company fails in one fiscal year to maintain its standard of general credit. This should follow the existing laws, however, in not allowing further investment in such a company's securities until the company has again attained the required standard, and in not allowing the term of probation to extend more than one year.

It was proposed by the committee that, at the request of any bank, the bank commissioner shall give his opinion as to whether a bond satisfies the requirements of the act. He may accept as evidence the regular annual financial statement, including the income account and balance sheet of the corporation, verified by the affidavit of the president or vice-president or treasurer. The bank commissioner, however, may require such further evidence as he may desire. He shall publish each year a list of the bonds approved. Unless notified by the commission to the contrary, a savings bank may consider any bond appearing on the list as an investment which it is authorized to make until a new list is published in which the bond does not appear. Unless the corporation, whose bonds have been approved by the bank commissioner as a legal investment, shall within three months after the close of its fiscal year furnish to the bank commissioner evidence of the regular annual financial statement, the bank commissioner may notify any savings bank, or all savings banks, that they are not authorized to make further investments in such bonds until contrary notice is given by their inclusion in the printed list or otherwise.

#### DISCUSSION ON THE REPORT

In reply to a question whether or not the field might be so narrowed as to have eligible securities quoted at a premium with less than a 5 per cent yield, Mr. Oldham stated that in the committee's opinion the forego-

ing restrictions represent the minimum ones which banks can use and be safe, whether they narrow the field or not. As regards the companies that will qualify, it has been absolutely impossible to obtain at the present time from public sources information which will satisfactorily test the provisions. The thought of the committee was that if it could come to some conclusions as to what were desirable provisions and restrictions, then it would get into touch with the public utility managers and hear what they have to propose. The committee stated that it would be glad to have them use this test on the bonds of their corporations and see how many of them will qualify and what provision it is that bars them out. If it finds in actual practice that it is barring out securities that ought to come in, it must see if it cannot word the law so as to include everything that can legitimately come in. Mr. Oldham said that the committee cannot make the test of every situation on the basis of information which is to-day available. Reports are made in all kinds of form and the information is very incomplete. In his opinion, the statements of public utilities, if the utility bonds are going to take their proper place in the market, should show greater uniformity.

In regard to depreciation Mr. Oldham stated that the ratio of  $1\frac{1}{4}$  to 1 for net earnings to fixed charges would allow sufficient margin to cover that item. If companies were starting afresh, depreciation should be included in operating expenses, in which case the ratio of net earnings to fixed charges might be only  $1\frac{1}{2}$  to 1. Practices in accounting for depreciation differed, but the committee felt that it was willing to stand for the  $1\frac{1}{4}$  to 1 ratio, which would provide enough to take care of the decreased earnings and proper charges for depreciation.

### Demand Charges and Purchased Power

In a paper on "Demand and Load-Factor Systems," presented by R. S. Hale, of the Boston Edison Company, at the recent convention of the New England Section of the National Electric Light Association in Pittsfield, Mass., reference was made to the purchase of power by street railways. The author compared a number of different systems of demand measurement and charge bases, pointing out that for a street railway, and especially for one of small size, the difference in charge between a five-minute and a thirty-minute demand would be large; probably 20 or 30 per cent, if not more. A small street railway with about the same business each month would have the highest demand on a system of demand measurement in which the highest five-minute peak is taken each month by itself, so far as eleven schedules compared in the paper were concerned. Such a road would have the next highest demand on a schedule taking the single highest fifteen-minute peak in the preceding twelve months. The next highest peak would be obtained on a system of charging based on the highest half-hour peak occurring since the last annual readjustment of demand by the central station organization. The next would be on a system averaging the four highest half-hour peaks, one on each of four different days in any one month, taking the highest month of the previous twelve months. The next highest demand for such a road would be obtained on a system averaging the 150 highest half-hour peaks (whether on the same day or on different days) in the whole previous twelve months, or a pro-rata number if the road has been connected less than a year. There would be perhaps 50 per cent difference between the first and last of the foregoing outlined methods.



# Fifth National Safety Congress

Street and Other Accident Reduction, Vehicular Traffic Regulation, the National Electrical Safety Code and Power Plant Hazards Were Among Topics Discussed at the Congress Last Week

THE fifth annual national safety congress, under the auspices of the National Safety Council, was held at the Hotel Statler, Detroit, Mich., from Oct. 17 to 20 inclusive. It was attended by about 1200 representatives of manufacturing industries, railroads and public service companies. The meetings were largely of a sectional character. The electric railway section meetings were attended by about sixty men, and nine papers were read and discussed at two meetings held on Thursday. Some of the discussion before the public utilities and public safety sections was also of interest to the electric railway men. An abstract of some of this material follows:

## *Electric Railway Section*

### THURSDAY MORNING SESSION

In opening the sectional meeting Chairman G. O. Smith, Doherty Operating Company, New York, explained that since the section was formed one year ago the activities had been confined to the membership campaign and the inauguration of the bulletin service. He then called for committee reports.

H. A. Bullock, Brooklyn Rapid Transit System, reported for the membership committee that eighty-nine electric railways are now enrolled, as compared with thirty-four a year ago. He stated that very pleasant relations have been established with the American Electric Railway Association and that arrangements are being made for reciprocal relations with the Safety Federation of America and the American Museum of Safety. He moved a vote of thanks, which was passed, to James H. McGraw and his associates on the ELECTRIC RAILWAY JOURNAL for their co-operation in this campaign. He also distributed copies of a catalog of lantern slides on safety topics, prepared originally for the Brooklyn Rapid Transit Company. Arrangements have been made by which these slides can be procured at a nominal price through the National Safety Council, Chicago, Ill.

After an informal report by Secretary C. B. Scott, Bureau of Safety, Chicago, Ill., the report of the committee on standards was read. This committee approved the use of near-side stops where possible and also the joint report on protection at grade crossings prepared by representatives of the American Railway Association and the National Association of Railroad Commissioners. However, as the American Electric Railway Association and the National Safety Council did not participate in this report it was recommended that a committee on the subject be appointed to work in conjunction with the American Railway Association and the American Electric Railway Association. The committee also indorsed the recommendations of the Massachusetts Highway Commission relating to increasing safety at the sites of eliminated grade crossings.

The standards committee also submitted an outline of the practice of one company in educating employees, and a list of car equipment features affecting safety.

Among other things it recommended that no men on the extra list be appointed to safety committees and that members of such committees be paid for the time put upon this work. Instruction schools, with sample equipment where practicable, were recommended for all companies which can maintain them.

For the committee on bulletin service Chairman Smith reported that special electric railway bulletins had been furnished during the year, although it had proved difficult to get this work started. Co-operation is needed, but ample material can be obtained.

### RELATIONS WITH EMPLOYEES AND THE PUBLIC

Two papers on this general subject were presented by J. L. Roche, Pittsburgh Railways, and H. H. Norris, ELECTRIC RAILWAY JOURNAL. C. G. Rice, Pittsburgh Railways, was scheduled to speak on "How the Attitude of the Public Toward the Railroad Company Is Influenced By Systematic Safety Work." He was not able to be present and Mr. Roche spoke in his place from Mr. Rice's notes.

Mr. Roche said that progressive corporations to-day have adopted a policy of fairness and frankness. The Pittsburgh Railways have a number of fundamental principles which serve as a guide to employees. These are illustrated in the code of ethics and policies outlined in the issue of this paper for Sept. 7, 1916, page 712. He said further that all accidents are due to human or material failure. The first results from incapacity, negligence due to lack of understanding or to monotony of task, etc., and willful negligence. The remedies were stated to be as follows:

Incapacity can be eliminated by careful selection of men and proper training and inspection thereafter. Negligence, other than willful, can be corrected by instruction, mental examination, inspection, discipline, welfare work and physical examination. Willful negligence can only be eliminated by discharge.

Coming to the public phase Mr. Roche said that there are three classes of chance takers: (1) Those who realize the danger and deliberately take the chance; (2) those who realize the danger but act thoughtlessly, and (3) those who do not realize the danger. In reducing the number of chance takers, explanation and seeking of co-operation are the factors. He then explained what the Pittsburgh Railways have done to control accidents, with the understanding that safety work must be sincere, systematic and persistent. This included an exhibit throughout the winter at a local exposition, the distribution of the "Pla-Safe" game invented by one of the company's men, the circulation of safety coins, etc., in other words, continually impressing the slogan "Safety Always."

Mr. Roche confessed that in spite of this work accidents have increased, but it has held down the rate of increase. He believed that a large part of accidents are preventable, that carelessness should be made a criminal offense, that safety rules should be standardized and that the means employed in safety work are incidental as compared with the object in view.

Mr. Norris next read his paper on "How the Safety Movement Is Helping the Electric Railway Solve Its Problems." He explained first that the purpose of the



paper was to draw, from a survey of the recent safety work of a number of typical railways, a few conclusions as to what is being definitely accomplished, with a view to justifying a reasonable and continuous expenditure of funds in this direction.

Eliminating from consideration all railway problems very remotely concerned he divided the remainder in two ways:

First, those in which money considerations are involved, and others in which the financial aspects are secondary.

Second, those which bear on the relations of a company with the public, and those in which only employees are concerned.

He said that the most critical problem in the electric railway to-day is how, while maintaining good service, to preserve a reasonable net return on investment in spite of increased service requirements on one hand and decreased income, as measured by purchasing power, on the other. Next in importance is the preservation and cultivation of good will on the part of the public, so that reasonable operating conditions may be assured and the confidence of investors maintained. A third problem is the cultivation of such relations with employees that loyalty and co-operation may be fostered for the purpose of aiding in the solution of the other two. He then raised the queries:

(1) Does systematic safety work pay in dollars and cents; (2) does it pay in fostering public good will, and (3) does it conduce to loyalty on the part of employees?

Mr. Norris then proceeded to answer these questions by means of examples drawn from the experience of many companies and introduced quotations from letters from leading railway men. His conclusions were as follows:

1. The safety movement is contributing to the solution of the most difficult problems before the electric railway to-day.

2. The contribution is more important in the way of providing means for the public, the employee and the company officials to meet upon a platform of common interest than in direct money saving.

3. The movement among electric railways is gaining momentum rapidly, but after this momentum has been acquired a sustained effort will be needed to maintain it.

Mr. Bullock opened the discussion on the papers by Messrs. Rice and Norris by stating that as papers like these accumulate in the reports of the section meetings they will furnish valuable material for safety campaigns. He firmly believed that applying the principles of safety will overcome prejudice and promote friendly public relations. J. H. Harvey, Kansas City Railways, agreed that when the keynote of the work is good will, pleasant relations with public and employee will result.

In reply to a question suggested by Mr. Norris's paper Mr. Smith explained that certain committees of trainmen sent out by the Toledo Railways & Light Company to inspect safety work on other properties had presented interesting reports, copies of which could probably be furnished if desired. Other speakers dwelt upon the factor of the problem introduced by the difficulty of getting and holding good men due to abnormal industrial conditions.

#### AUTOMOBILE HAZARDS

The next paper read by the author, W. W. Lowe, Toledo Railways & Light Company, was entitled "Preventing Accidents Between Street Cars and Automobiles." He first pointed out that automobiles have both reduced revenues and increased accidents. In endeavoring to reduce the latter he believed that humanitarianism should be the basis of effort. He then quoted statistics

from H. G. Winsor's Atlantic City convention paper on this subject, showing the tremendous increase in numbers of automobiles registered and of collisions. It was estimated that 5,000,000 cars would be in use in this country in 1920. Mr. Lowe said that in Toledo 78 per cent of the accidents occur outside of the congested district, the peak occurring when people are returning from work.

Taking up remedial measures Mr. Lowe divided them between education and restriction. The latter plan is successful abroad. He mentioned the following measures: (1) Systematic education of railway employees; (2) following up their training; (3) education of automobile drivers as to the results of carelessness; (4) restrictions as to the issuing of chauffeurs' licenses; (5) traffic regulations, and (6) enforcement of the last-named.

He thought this subject important enough for special consideration by a committee.

The discussion on Mr. Lowe's paper was opened by W. E. Cann, Detroit United Railway, who referred to the appalling recent increase in collisions with vehicles in Detroit. This is an automobile city, and there is much reckless driving. The effort to educate drivers has not been successful. He advocated the locking up of law-breakers' machines and said that electric railways must get behind law enforcement. On motion of Mr. Scott the section then approved Mr. Lowe's suggestions and requested the Council to carry them out.

F. E. Rankin, Detroit United Railway, said that good drivers caused as many collisions as green ones. Another speaker considered most traffic ordinances too complex, as even the traffic officers do not always understand them. He thought that the proposed committee should attempt to standardize these ordinances. His company trains its chauffeurs just like motormen, and he said that drivers among the public should be similarly trained.

In response to a question as to the offsetting of increases in automobile collisions through reductions in other types Mr. Lowe said that the totals have increased. H. B. Adams, Aurora, Elgin & Chicago Railroad, Aurora, Ill., then described a letter campaign conducted in conjunction with automobile clubs, which he said had produced a good response. Mr. Cann also described a recent check made at a crossing to determine the effect of the warning bell. Seventy per cent of the drivers paid no attention to the bell and 30 per cent crossed while the bell was ringing.

Dr. F. D. Patterson, Pennsylvania Division of Labor and Industry, Harrisburg, Pa., said that there should be a law requiring a driver to carry a card with his photograph upon it, and on the back of this card his court record could be entered. While agreeing that this would be good S. H. Reid, Middle West Utilities Company, Chicago, Ill., thought it could not be introduced soon. Referring to a motorman in Philadelphia who did not have an accident in forty-five years and to other cases of men who do not have accidents, he said that education of motormen will bring good results. On the other hand, J. C. Rose, chief claim agent Pennsylvania Railroad, said that the burden is on the vehicle driver. In answer to a question as to the prosecution of automobile drivers, Dr. Patterson said that it is the custom of the Long Island Railroad to prosecute those who cause damage. The railroad sues for the amount of the damage and sometimes collects it. In response to another question F. W. Fisher, Rochester (N. Y.) Railway & Light Company, said that at a crossing near Rochester automobiles are required to stop before crossing a high-speed interurban line.

The last paper on Thursday morning was by H. W. Clapp, Columbus Railway, Power & Light Company,



Columbus, Ohio, on "How Graphic Charts and Bulletins Help in Safety Education." He began with the statement: "Charts are the text-book of safety" and explained that in his company systematic educational work was undertaken because the spasmodic work was seen not to have been successful. He said that cartoons had proved efficacious in interesting indifferent bulletin board readers. In the bulletins this company uses graphics freely and feels that the boards are responsible for much of the interest in safety.

Mr. Clapp exhibited some sample charts in which the records of collisions with automobiles and related data were clearly shown. The cartoons were in blue print form. The result of the work has been to keep down the rate of increase in these accidents as compared with other cities. The result would have been better but for the large number of new men employed, as new men cause accidents. At present a safety contest is on. At its close \$1,000 will be distributed so that men in the winning carhouse will receive two days' pay each and those in the second carhouse one day's pay.

In the discussion of this paper Mr. Bullock said that Mr. Clapp's plan for comparing data of successive years requires reasonably stable conditions in the districts served by the different carhouses, otherwise inequalities could creep in. In Brooklyn, for example, the population shifts radically at times. To this Mr. Clapp agreed, stating that in Columbus there are no violent changes in population. Furthermore on account of the low fare, averaging 2.65 cents gross, the extension requirements are reasonable. Under the present franchise the population is not being spread out much. Conditions are ideal for the present contest.

#### NEW OFFICERS OF THE SECTION

Before closing the Thursday morning session the following elections for the ensuing year occurred: Chairman, H. A. Bullock, Brooklyn Rapid Transit System; vice-chairman, E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa.; secretary, J. H. Harvey, Kansas City Railways; chairmen of committees—membership, George Oliver Smith, Doherty Operating Company, New York; standards, C. G. Rice, Pittsburgh Railways; safe practices, H. W. Clapp, Columbus (Ohio) Railway, Power & Light Company; program, H. G. Winsor, Puget Sound Electric Railway, Tacoma, Wash.

## *Electric Railway Section*

#### THURSDAY AFTERNOON SESSION

The first paper at the second session was by J. H. Harvey, Kansas City Railways, on "Safety and Efficiency," in which he described the recent campaign inaugurated by his company. The situation in Kansas City regarding the former attitude of the public was described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Sept. 30, page 667. Before beginning its campaign the company sent a representative to other cities to study the results of campaigns, and membership in the National Safety Council was taken out.

Mr. Harvey explained that the safety organization provided comprised the following: A general safety committee consisting of representatives of the claim and legal department, the publicity agent and the superintendent of efficiency; a supervisor of safety directly under the foregoing; a central safety committee consisting of the heads of nine departments, and departmental and local committees. The work was organized to reach the schools, vehicle drivers and owners,

the general public and the employees. The details of the several divisions of the work were then discussed by the speaker, indicating that the campaign is being conducted along modern lines.

The discussion was opened by C. C. Johnson, Virginia Railway & Power Company, Richmond, Va., who explained the plan for the coming safety-first week in that city. This will begin on Nov. 6 and will be conducted in connection with the Boy Scouts and with the co-operation of the police department. Mr. Scott agreed with Mr. Harvey in the contention that safety work with employees is most important. He expressed belief in an organization which makes trainmen an important part of the safety work, and in the importance of holding meetings with them if possible every thirty days.

#### THE NATIONAL ELECTRICAL SAFETY CODE

The second paper was by W. J. Canada, United States Bureau of Standards, Washington, D. C., on "The Application of the National Electrical Safety Code to Electric Railway Construction and Operation." He first traced briefly the history of the code and said that the American Electric Railway Association and the National Safety Council began very early the constructive criticism of the code, and the assistance which these associations thus gave has been very helpful.

There are still, however, certain apprehensions remaining in the minds of some of those least thoroughly acquainted with the safety code as to the effect that even the trial adoption and use of the code will have on the electrical industry. These apprehensions have, in general, been growing less as the acquaintance with the code has become closer through careful study of its provisions.

Commissions in general are approaching the introduction of the code with full appreciation of the difficulties involved in applying a definite standard to a kind of construction and operating practice in many ways as yet not standardized. They express the intent to make their administration moderate and reasonable and the feeling that standardization in closer detail will be feasible and desirable at a later date than is practicable at the present time.

Referring next particularly to the electric railways Mr. Canada said that the principal life hazards of electric railways are traffic hazards, but the electric life hazards, while less, are still unnecessarily great, since many of them are known to be avoidable through feasible precautions, such as the safety code presents. Most, even of the electrical safety problems of electric railways, are common to all branches of the electrical industry. For example, the electrical utilization hazards in railway carhouses and in the electrical car equipment handled by the motormen are, except in detail, the same as those of electrically equipped factories where the electrical equipment is incidental to the other processes carried on and requiring attention of the workers.

In outlining those code rules which refer especially to electric railway conditions, Mr. Canada said that all transmission lines, underground distribution and overhead feeders are classified in the code with electrical supply lines of the same voltage and general character and are required to comply with all the rules for strength of their construction in the same way as such supply lines. Where practicable, overhead lines of various users should be arranged by mutual agreement of the utilities concerned at standardized levels throughout a given community in order to minimize difficulties and dangers when new crossings or extensions to existing lines are to be installed. Parallel pole lines, where practicable, should be so separated from each other as



not to conflict; but if this is not practicable, a common pole line is preferable to two conflicting lines, unless the high voltage of certain circuits or the large number of conductors make the use of a single pole line undesirable or impracticable.

The speaker then took up in considerable technical detail the special rules governing the construction of the electric railway itself. For example, third-rails are required to be protected, where not on fenced rights-of-way, by suitable overlapping guards. Third-rails may well be protected even on fenced rights-of-way where the presence of employees is often necessary. Trolley contact conductors under 750 volts are to be maintained at sufficient tension and with supports sufficiently close together so that the breaking or loosening of a single conductor fastening will not allow the trolley conductor at any point to come within 10 ft. from the ground, etc.

On the subject of "Operating Precautions for Electrical Workmen and for Trainmen," he said that the precautions which can be expected of motormen or conductors in the handling of electrical equipment on cars are very limited, and no rules for them have been included in the code. When some adjustment has to be made under the car or on top of the car or within the car, and not directly affecting car movement, it is presumed that the general instructions to trainmen will call for removal of current collectors from trolley contact conductor or third-rail before proceeding. Adjustments on top of cars are always dangerous because of proximity to live trolley wire. For adjustments concerned with ordinary operation of the car, or necessary in emergencies while car is running, no precautions against electrical shock or burn should be demanded of the trainmen. His undivided attention is demanded for his handling of his car's movement in such a way as best to protect passengers and exterior traffic. The line and car construction requirements of the safety code outlined in the code will assure the trainmen of reasonable immunity from electrical dangers during ordinary car operation, and by protecting him will also safeguard his passengers.

A brief discussion followed the presentation of the above paper relating principally to technical details of grounding transmission lines and cables for the protection of workmen.

#### POWER HOUSE HAZARDS

F. W. Fisher, Rochester (N. Y.) Railway & Light Company, next read a paper on "Hazards in Power Houses and Their Remedies." He divided the former into two classes—construction and operation. The former, he said, were thoroughly covered in the paper by Mr. Penrose, abstracted on the next page. In operation there are those hazards which are common to all industries and those inherent to power house operation. Of power house accidents, from the experience of his company, he had found that 16 per cent were non-electrical burns, 16 per cent were electrical burns, 15 per cent were due to falls, etc., 13 per cent to falling materials and the remainder to sundry causes. Of this class of accidents 38 per cent were inherent to power house work. Some were due to faulty design, others to faulty operation of machinery.

Mr. Fisher felt that new power plants are being built with due regard to safety considerations, and he had in mind in his paper particularly those of the older type. He put in a plea for a careful safety study of individual properties, particularly of those which had been built for some time.

W. F. M. Werth, Detroit United Railway, opened the discussion by referring to the special hazards of the

boiler room which he thought should have more attention. The men in the boiler room are apt to become slack and to incur unnecessary risks. He raised a question as to Mr. Fisher's recommendation that switchboards should be isolated from the engine room on account of safety. Mr. Fisher said that in some cases this is desirable to protect them from escaping steam.

Mr. Scott said that he considered the percentage of accidents of an inherent power house nature, as reported by Mr. Fisher, to be quite high. In an analysis made by himself only 8 per cent of 6000 accidents were due to electric current. However these represented 70 per cent of the money cost of the accidents, and 71 per cent of the fatalities and of the time lost over thirty days. In response to a question as to what he termed an accident Mr. Fisher replied that in his data anything reported to a foreman was so considered.

#### CAR EQUIPMENT AND SAFETY

The next paper was one by C. H. Cross, Milwaukee (Wis.) Electric Railway & Light Company, on "Safety Devices on Electric Street and Interurban Cars." These he divided into two classes, audible devices and visible devices. He first showed that inclosing the motorman's platform to protect him makes it more difficult for the motorman to operate his car safely.

Mr. Cross then took up systematically all of the devices on the car which affect safety of operation. In so doing he mentioned the present tendencies in each case and commented upon the efficacy of the several devices. He also recommended the standardization of signal operating parts in the interest of safety.

The list of devices covered by the speaker included brakes, buffers, controller locks, circuit breakers, grounding connections, prepayment equipment, safety gates, door signals, fenders, fire extinguishers, headlights, safety signs, sanders, safety treads, tail lights, window guards, etc.

Under the head "platform safety" he discussed briefly the organization and discipline necessary in making the above-mentioned devices effective.

#### PHYSICAL EXAMINATION AND SAFETY

At this point Dr. C. M. Harper, surgeon Toledo Railways & Light Company, was called upon and responded with some cautions regarding physical examination of employees. He said that many of these are farces and that a thorough examination requires at least two hours. Team work among physicians is necessary so that the services of specialists in several lines may be utilized. This costs money, but it is a good investment. Companies cannot expect good work if they pay for it in passes only.

#### INSTRUCTION OF MOTORMEN

The last of the electric railway papers was by H. B. Adams, Aurora, Elgin & Chicago Railroad, Wheaton, Ill., on "Methods of Instructing New Motormen in Their Duties." It was a description of the method used on a modern property where the instruction is not done in a school, but is given by the motormen, the shop foremen, the service inspector and the safety supervisor. The applicant serves for a time with a motorman on each of the city and interurban lines and the third-rail line, is shown the equipment in the shop and is subjected to numerous examinations.

In response to a question Mr. Adams said that the motormen are all re-examined every six months.

#### CLOSE OF ELECTRIC RAILWAY SESSION

In bringing the electric railway meetings to a close Mr. Bullock took the chair and announced the plan for the coming year. He said that first the effort will be



to expand the membership and to cement the friendly relation with the American Electric Railway Association. Next the special bulletin service will be developed and made more responsive to the needs of the members. In co-operation with the United States Bureau of Education the school safety work will be pushed. Finally it is hoped that the committee on standards may get up a set of safety organization plans adapted to the several requirements of typical classes of roads.

## Notes on Other Section Meetings

In addition to the special electric railway section meetings several papers at other section meetings related more or less closely to the electric railway field. This is true particularly of the public safety and public utilities sectional meetings.

### PUBLIC SAFETY WORK OF PUBLIC SERVICE COMPANIES

Under the above title, at the public safety meeting held on Friday, H. A. Bullock, Brooklyn Rapid Transit System, traced the relation of public safety and public relations, stating first that public street hazards are the largest element of electric railway hazards. In this work a friendly atmosphere must first be produced and then the proper mental attitude of the public must be created.

The public attitude is made up of a number of elements: prejudice, indifference, objection to interference with personal liberty, political interference and natural carelessness and recklessness. These points Mr. Bullock took up in order somewhat as follows: First, prejudice must be overcome by the railway "cleaning house" itself and furnishing service with a degree of safety compatible with the conditions of operation of an inherently dangerous business. Then the facts must be duly advertised.

To overcome indifference statistics and details of accidents must be given out. People will be reasonable also if they realize that safety comes about through self-imposed restraint, and this they can be made to do through suitable advertising. As to political interference, the best plan is to leave office holders alone, as they will be glad to take hold after the work has been started. Finally, on the matter of recklessness it should be remembered that long protection of the individual by society has caused him to relax his vigilance. He needs further protection from his own sense of security. Patience and experiment are needed at this point, and the schools and the newspapers will be the potent factors in this work.

### LOCAL ORGANIZATIONS FOR SAFETY ACTIVITIES

At the public safety meeting another speaker was R. W. Campbell, Illinois Steel Company, Chicago, Ill., who also presided in the absence of Chairman E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa.

Mr. Campbell outlined the ideal safety organization in a community under the direction of a local branch of the National Safety Council. His plan comprehended the co-ordination of all local activities under appropriate committees. His complete plan is available in pamphlet form.

### STREET TRAFFIC REGULATION

Still another topic relating to public safety was that of street traffic regulation, as presented by William P.

Eno, traffic expert. Mr. Eno presented an abstract of a pamphlet on this subject which has also been issued by the Council.

### POWER STATION SAFEGUARDING

Reference was made earlier in this report to a paper by Charles Penrose, Philadelphia Electric Company, on means for preventing accidents in power plants. In connection with this paper Mr. Penrose showed a number of lantern slides from drawings and views of one of the newer plants of his company. He divided his topic into erection safeguards, permanent safeguards and the relation of the employee to station safeguarding. The paper was so exhaustive that only a brief abstract is possible here. However, the following points are typical of the line of treatment.

During construction, electrical equipment should be largely used, and it should be installed with care, especially wiring and transformers. The architect's specifications should be so drawn that suitable safety clauses are provided. During construction there should be full co-operation with the local inspection bureau. As the work proceeds the clean-up gang should do its work properly to eliminate risks caused by rubbish. It might be well for the utility to employ a safety inspector to study accident hazard continually.

Assuming the building itself to be well constructed there next comes the layout of the equipment to eliminate risk. The modern plant is simple in construction and is provided with oil switches and reactors as protection. The high-tension apparatus is isolated and suitable indicating devices show the condition of switches. Duplicate bus bars are provided for emergency use. Stairways are used in place of ladders, pipe lines are plainly designated by distinctive painting, and foolproof signal systems, etc., are used.

Finally every possible device is used to encourage the employee to protect himself.

### ELECTRIC RAILWAYS REPRESENTED

The following is a list of the electric railway companies represented at the meeting:

- Aurora, Elgin & Chicago Railroad, Aurora, Ill.
- Boston (Mass.) Elevated Railway.
- Brooklyn (N. Y.) Rapid Transit Company.
- Columbus (Ohio) Railway, Power & Light Company.
- Columbus (Ga.) Railroad.
- Connecticut Company, New Haven, Conn.
- Detroit (Mich.) United Railway.
- Doherty Operating Company, New York, N. Y.
- East St. Louis & Suburban Railway, East St. Louis, Ill.
- Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.
- Grand Rapids, Grand Haven & Muskegon Railroad, Grand Rapids, Mich.
- Houghton County Traction Company, Houghton, Mich.
- Kansas City (Mo.) Railways.
- Keokuk (Iowa) Electric Company.
- Louisville & Southern Indiana Traction Company, Chicago, Ill.
- Middle West Utilities Company, Chicago, Ill.
- Milwaukee Electric Railway & Light Company, Milwaukee, Wis.
- Ohio Electric Railway, Springfield, Ohio.
- People's Railway, Dayton, Ohio.
- Pittsburgh (Pa.) Railways.
- Rochester Railway & Light Company, Rochester, N. Y.
- Shore Line Electric Railway, Norwich, Conn.
- Toledo Railways & Light Company, Toledo, Ohio.
- Virginia Railway & Power Company, Richmond, Va.



# American Association News

The Mid-Year Meeting of the Association Will Be Held in Boston—President Storrs Made a Surprise Visit to the Public Service Section at Its Meeting on Oct. 19—Reports of Various Other Company Section Meetings Are Recorded

## Boston Selected City for Next Mid-Year Convention

The city of Boston has been selected by the executive committee as the place for holding the next mid-year convention of the American Electric Railway Association, and the date has been set tentatively as Feb. 2. The meeting will be in general charge of Matthew C. Brush, president Boston Elevated Railway Company, who has been appointed by President Storrs to be chairman of the mid-year meeting and dinner committee.

## Meeting of Denver Tramway Company Section

The first regular meeting of the Denver Tramway Company Section for the coming season occurred on Sept. 26 and was the thirty-seventh monthly gathering of the section. The paper of the evening was presented by A. M. Evans, assistant in charge of track, and described a trip of inspection recently made by him to the Pacific Coast. The paper which was illustrated by lantern slides gave an account of the standards and practice in Salt Lake City, Los Angeles, San Francisco, Oakland and Portland, and related particularly to the track standards in those cities.

## Public Service Company Section Elects Officers

The first meeting of the Public Service Section was held in the new auditorium of the Public Service Terminal on Oct. 19. President Graham, division superintendent, of Camden, N. J., occupied the chair.

As a surprise to the members, L. S. Storrs, president of the Connecticut Company, who was recently elected president of the American Electric Railway Association, was present. He was introduced by Martin Schreiber and gave a brief talk on the future of the association. Harlow C. Clark, of the association office, then spoke on the activities of the association and characterized the meeting at Atlantic City as the best convention ever held by that body. Martin Schreiber, engineer maintenance of way, outlined a campaign for obtaining individual membership, and spoke of the success that the committee on individual membership had already achieved. L. C. Bradley of Houston, Tex., who was recently elected president of the American Electric Railway Transportation & Traffic Association, was scheduled to speak on training men for supervisory and executive positions but was unable to be present, having been called back to Texas on important business.

H. F. Burr, C. F. Backman, D. C. McDougall, F. L. Walsh and W. J. Hughes, who acted as delegates to the convention from the Public Service Railway, gave a short review of matters of interest to the members which pertained to their departments.

The annual election of officers which was then held resulted as follows: President, A. T. Warner; vice-president, H. D. Briggs; director, F. L. Folks; secretary, Frank Davis, and treasurer, A. H. Jones. Resolutions of sympathy for Messrs. Harrison and McCourt, who have been called to the great beyond since the last regular meeting, were passed.

## Washington Railway & Electric Company Section Meeting

The meeting of the company section of the Washington Railway & Electric Company, Washington, D. C., was held on the evening of Oct. 16, and the principal speakers were W. F. Ham, vice-president of the company, and J. T. Moffett, superintendent of transportation, and the newly elected president of the company section. Mr. Ham reviewed the work done at the recent convention at Atlantic City. He also discussed the fare problem and referred to grants of higher fares than 5 cents in some New England cities. The talk of Mr. Moffett related principally to the subject of car standards. The following officers were elected to serve for the ensuing year: J. T. Moffett, president; William L. Clarke, vice-president, and L. B. Schloss and W. F. Degment, directors, and R. A. Vetter, secretary and treasurer. C. P. King, president, and W. F. Ham, vice-president Washington Railway & Electric Company, were elected ex-officio members of the board of directors.

## Milwaukee Section Hears Announcement About Medal

At a meeting of the Milwaukee Company Section, held on Oct. 12, President Dentz announced the award to Bert Hall at the American Electric Railway Convention in Atlantic City for his paper on "Co-operative Activities," this being selected as the best company section paper read during the previous year and submitted in competition. The section then listened to an address by M. C. Potter, superintendent of schools, city of Milwaukee, who said he had been much impressed with the work being undertaken by the Employees' Mutual Benefit Association toward conserving the health of its employees. He also discussed the Page bill, which is intended to provide an appropriation for industrial schools in different cities.

After some musical selections Henry Grimm, of the claim department, read a short paper on current events in that department. The trials and tribulations of an investigator were described, and numerous instances were cited to show the unnecessary expenditure of money by the company because of insufficient information being furnished to the claim department. Before the close of the meeting the president announced that the nomination and election of officers for the ensuing year would take place at the next meeting, and that the way and structures department would prepare and read a paper on current events at that time.

## Capital Traction Section Elects Officers

The annual election of the Capital Traction Company Section No. 8, American Electric Railway Association, was held on Thursday evening, Oct. 19, in the Assembly Hall, Thirty-sixth and M Streets, N. W. About 100 were present. After the meeting was regularly called to order by President Dalgleish, at 8.15 p. m., the following officers were elected for the ensuing year: President, F. Morrill; vice-president, Elon von Culin; secretary, J. E. Heberle; treasurer, A. Wilkinson; director



(for three years), John McKay. Each of the newly-elected officers was called upon and made a few remarks.

Col. C. W. Kutz, engineer commissioner of the District of Columbia and chairman of the Public Utilities Commission of the District, addressed the meeting on "Some Phases of the Engineering Work of the District of Columbia," illustrating his remarks with a number of lantern slides. The address included a description of the sewer department, street cleaning division, bridges, water service, trees and parking, and schools. He also spoke of the relations between the commission and the utilities and among other things said:

"The Public Utilities Commission was not created by Congress for the purpose of exercising an arbitrary jurisdiction over the utilities of the District, but was intended to act as an agency for doing justice to both the public and the utility companies, and this is the spirit which actuates the commission."

Col. R. D. Simms, treasurer of the company, and A. Wilkinson of the claim department, were called upon and entertained the section with a number of short stories. At the conclusion of the meeting a buffet luncheon was served.

## COMMUNICATIONS

### Newspaper Publicity Commended

SOUTHERN PUBLIC UTILITY COMPANY,  
CHARLOTTE, N. C., Oct. 23, 1916.

To the Editors:

Since my return from the Atlantic City convention of the American Electric Railway Association I have taken the time to study carefully the papers presented on publicity and the discussion resulting from them, and I am struck with the fact that practically nothing was said concerning the use of newspapers by public utility companies. This, to my mind, was not an oversight on the part of those discussing publicity, but resulted, I believe, from the fact that the program of the Transportation & Traffic Association dealt with "Company Publications, Their Use and Value; and Their Preparation and Publication." Not even in the address of Mr. Lee, who is admitted to be a leader in corporation publicity, was there great stress laid upon the use of regular newspaper advertising, and it occurs to me that in future sessions of these associations it would be well to include in the discussion of this important subject the matter of using the newspapers of the localities in which the various newspapers are published.

It is true, undoubtedly, that there is a value to company publications, yet they do not nor can they take the place of the legitimate newspaper advertising. And I note with great pleasure and with full approval, the campaign of the ELECTRIC RAILWAY JOURNAL toward the frank discussion of the problems arising in the operation of public utility companies, through the newspapers, for the information of the general public which, as is manifest, constitutes our patrons and customers.

There is a danger, however, of the too free use of newspaper advertising by reason of the fact that it is an easy matter to leave the impression on the publishers of newspapers that the utility company is attempting to influence their attitude toward them and toward the public service. Such a situation is one which should scrupulously be avoided. A newspaper should at

all times, in my opinion, reflect public opinion. It is true that in some cases the newspapers attempt to make public opinion for reasons best known to themselves, and occasionally it is the case that they use their power in the community to the detriment of the utility company. But it has been my experience that the public is not to be hoodwinked in this regard for long at a time, and invariably it is the newspaper that suffers when a movement of this sort is attempted.

The newspapers should always be given the facts in the case, and after more than sixteen years' work with newspapers and newspaper men I have met but one who would refuse to deal fairly with the corporation and with the public. The newspaper which can be "controlled" by the utility company is not a friend of that company, no matter how strenuously it may strive to be. This is because the public will soon arrive at an understanding of the facts in the case and realize fully that the paper is not printing all the news but that it is deceiving its subscribers into believing that it is protecting their interests when, as a matter of fact, it is assisting the corporation to suppress facts of which the public should have knowledge.

At the same time every public utility company should use all the advertising space in its local newspapers that will bring results. There are several reasons for this, the first being that the American people read the daily newspaper, and if the utility company presents its position, day after day, through this medium, the public will eventually come to a better understanding of the facts and will be able to better judge between the claims of the demagogue and the representative of the company when controversies arise.

And another and important reason is that in every community, and I say this without fear of successful contradiction, the newspapers are community builders. They do more toward building bigger and better cities and towns and more to develop the latent resources of a section than all the boards of trade and chambers of commerce and rotary clubs ever organized. And with more people, better living conditions and increase in the wealth in a given section comes more business of a more satisfactory sort for the utility company. Therefore I say that the support of the local daily newspapers is a most essential means through which to add to the revenues of a company serving the general public, aside from the direct returns from the use of advertising space at a reasonable and fair rate.

It is true that occasionally it is good business to use advertising space in a newspaper that is manifestly unfair and unjust to the utility company? This is questioned in some sections, and I can readily understand the position taken and the reason for it. But if a newspaper is really unfair and unwilling to give the company a square deal, it is still possible that its readers do not form their opinion from its attitude, and advertising space relative to the use of electric and gas energy will oftentimes bring direct results. In cities in the Middle and Far West I have personally known this to be true.

The use of advertising space to educate the public concerning the abuses of public utility companies' property is one of the methods I have in mind. For instance, the practice of certain automobile owners and drivers to ignore municipal laws and regulations relative to the movement of traffic. Instances of accidents occurring as a result of these violations are numerous, and by using advertising space in the newspapers it is possible so to arouse public opinion as to lessen this danger, to say the least, if not to entirely eliminate it.

There are numberless ways in which the utility com-



pany may and should use advertising space in the newspapers, in connection with the company's publications, each of which will commend itself to the serious consideration of the management of every company when all the facts are known.

It is for these reasons that I suggest, through the *ELECTRIC RAILWAY JOURNAL*, that at some early session of the American Electric Railway Association and its affiliated organizations, arrangements be made for a discussion of the entire question of publicity from every possible angle.

LEAKE CARRAWAY,  
Director of Publicity.

## Accounting Inconsistencies and Fallacies

UNION TRACTION COMPANY OF INDIANA  
ANDERSON, IND., Oct. 18, 1916.

To the Editors:

I have read with interest the editorial, "Facts—and the Wider Vision," in your issue of Oct. 14.

The public accountant who discussed inconsistencies and fallacies in commission accounting regulations at the Accountants' Convention devoted considerable time to criticizing the steam road classification of equipment rental accounts.

I am wondering if the speaker (Mr. Dunn) has read the electric railway classifications. If he were familiar with them and had known something of their history he should have known that the electric railway accountants persuaded the Interstate Commerce Commission long ago to avoid the very inconsistency regarding rentals which Mr. Dunn so sharply criticizes. I refer Mr. Dunn to Accounts Nos. 97, 98, 115, 116, etc., in the Interstate Commerce Commission System of Accounts for Electric Railways, issue of 1914, also your editorial entitled "Accounting for Rents" in the issue of Nov. 13, 1915, in which you say "the electric railway method of accounting for rents constitutes a real advance in utility accounting, secured through the earnest efforts of electric railway accountants."

Mr. Dunn waves a red flag and shouts "danger," figuratively speaking, at sight of "Surplus Appropriations" accounts in the classifications. These are about as dangerous, in the writer's opinion, as a man of straw. In the first place, their use is not mandatory, and, in the second place, I doubt if they are used by one railway accountant in fifty.

Mr. Dunn sends "a message to executives and directors to beware of appropriation accounts." I think most accountants, directors and executives pay little attention to these accounts, which are usually considered not nearly so important as the criticism would indicate. The surplus may be appropriated "at the option of the carrier," as clearly stated in the General Instructions of the Interstate Commerce Commission. If the appropriation accounts were used they would be memoranda and as such relatively unimportant. Mr. Dunn assumes that if such memorandum accounts were entered, the carrier might be stopped from later making any different disposition of the actual cash surplus by declaration of dividends or otherwise. I do not understand this to be the case. If a dividend had been earned and the directors decided to pay it, the situation would not be changed if some memorandum accounts had been made up concerning a tentative disposition or "appropriation" of surplus earnings.

Mr. Dunn also touches upon the subject of Sinking Fund Reserves, and he might well have devoted some time to specific criticisms of the treatment of Sinking

Funds, such as the Wisconsin requirement that accruals to Sinking Funds be charged against the monthly income account and the New York requirement that sinking fund accruals be included in a group of "Income Deductions Accounts."

Electric railway accountants are aware of the seeming inconsistency of the Interstate Commerce Commission treatment of depreciation accounting and the lack of harmony between features of the accounting systems prescribed by regulatory commissions, such as the Montana requirement that depreciation expense account shall cover "all expenditures for ordinary repairs, renewals or replacements," etc., and the provision by New Jersey and Maryland that amounts charged to the maintenance accounts for repairs shall be deducted from the amount estimated to cover the wear and tear, obsolescence and inadequacy for the period, crediting only the difference to depreciation reserve. None of these inconsistencies was mentioned in Mr. Dunn's interesting treatment of the subject.

An effort was made to procure advance copies of Mr. Dunn's paper, but this was not possible. Otherwise there might have been a very valuable discussion and some constructive, rather than destructive, criticism of some of the subjects mentioned in his address.

W. H. FORSE, JR.

## Interurban Electric Railway Finances

MILWAUKEE, WIS., Oct. 21, 1916.

To the Editors:

Referring to the contributed comment by A. J. Boardman to the article on "Present and Future Development of Interurban Railways," contained in your issue of Oct. 7, I would suggest that the criticism is somewhat premature. This article and those succeeding are not intended to reflect upon the financial standing of any property but rather to indicate in a general way after a survey of the situation throughout the country some of the facts which have affected the development of the interurban railway and the more pressing problems now confronting it.

The statement "that the interurban is not a device for promoting the growth of communities," to which exception is taken is not exact, the actual quotation from the article being "The place of the electric interurban in the economic scheme of the country is that of a transportation agency and not primarily that of a device for promoting growth of communities. In so far as it may be self-supporting as a transportation agency, it may serve the other purpose as well, but privately owned it must earn or go out of business." While there are a number of towns that have been largely built up by the coming of the interurban, this does not alter the fact that the greater number have been disappointed in the fact that the actual development has not conformed to the anticipated growth of the towns served. The interurban has been dependent for its earnings primarily upon existing need for transportation rather than upon prospective town development.

Discussion of financial results will be contained in forthcoming articles. It may be pointed out, however, at this time, that many electric railway operators have found difficulty, under existing conditions, in building their lines at a figure of \$30,000 a mile, such as Mr. Boardman cites, and operating them with a ratio of 58 or 60 per cent for expenses, when there is included in expenses such items as taxes and reserves to insure the replacement of the physical property where it can no longer be economically repaired.

F. W. DOOLITTLE.



## Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Soldered Bonds Prove Reliable—Gas-Welding in the Car Shop—Safe Method of Supplying Current to Cars in the Shop—Third-Rail Bonding in New York Subway—Unloading Cars at Small Expense—Other Items of Practical Interest

### Soldered Bonds Make Good Record

Seattle Railway After Twelve Years' Experience Believes This Type of Bond to Be the Most Reliable

BY E. J. MC ILRAITH

Superintendent of Way and Structures, Puget Sound Traction, Light & Power Company.

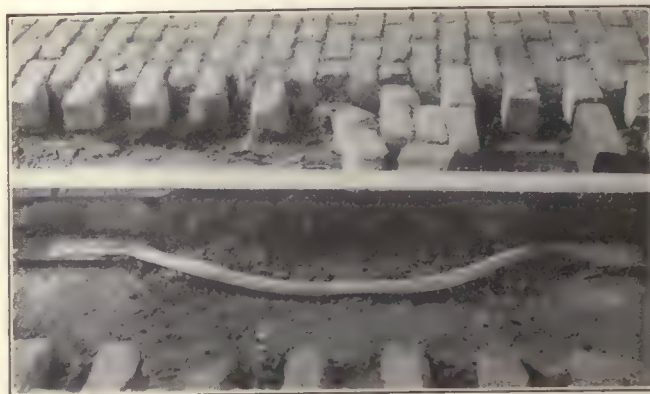
The Seattle (Wash.) Division of the Puget Sound Traction, Light & Power Company has been using only the soldered type of bonds for many years. Since this company is one of the few using soldered bonds, the performance data and costs of installation may be of interest.

Prior to four years ago, a considerable number of concealed bonds with solid formed ends were soldered to the web of the rail, but these were poorly installed, and many were stuck only at one end when placed. This type still shows a high percentage in the list of defective bonds. Others that run high each year, in the number giving high resistance, are the No. 00 exposed cable bonds that were put on at the time when bonds were considered merely a necessary evil, not an asset. We are replacing these rapidly as the loosening of the plates lowers the conductivity of the joint below our standard.

There are on the system of 203 miles of track 40,794 bonds, exclusive of those used around special work. These are tested twice each year at a cost of 0.375 cent per bond. On most of the track a resistance per bond equivalent to 12 ft. of rail is the maximum allowed before rebonding, but on tracks of heavy current flow 10 ft. is used. On this basis the defective bonds found in the last semi-annual test were classified as follows:

Type of Bond	Number of Bonds	Per Cent of Total Bonds Installed
2/0 cable (exposed) found too small.....	196	0.48
Concealed, formed and soldered.....	466	1.14
4/0 cable, broken strands.....	41	0.10
4/0 cable, poor contact.....	5	0.012
Cable bonds (exposed) stolen.....	55	0.134
New joints where rails were cut.....	41	0.100
Total .....	804	1.97

It is seen from the table that only 101 bonds of the class used mostly during the last twelve years have



FINISHED INSTALLATION OF SOLDERED BOND

proved defective or have been stolen. This is about one-quarter of 1 per cent of the total number of the bonds now in use.

The cost of these bonds installed, with copper and solder prices about 25 cents per lb., and wages of men averaging 28 cents per hour, is \$1.50 per 350,000 circ. mil. bond and \$2 per 500,000 circ. mil. bond. The resistance per bond is 0.0001085 ohm and 0.0000740 ohm respectively. There is a little difference in the lengths of the two sizes as installed. The resistance of an equal length of 80-lb. rail using an 8-in. No. 0000 concealed bond, would be about 0.000065 ohm.

This company has had excellent service during the last twelve years from stranded cable, outside bonds soldered to the base of the rail. The cost per bond is high, but good reliability is obtained. The cost of replacing a defective concealed bond in paving is much greater than the cost of replacing an outside bond, owing to the bolt wastage, the extra paving disturbance and the removal of the joint plates, which cannot always be replaced in as good condition as before.

The writer does not feel that the records of other types of bonds can show the reliability per mile of track that a well soldered bond of this company's type is showing. Possibly a short gas welded bond placed on the head of the rail will prove equally desirable, and this type is being experimented with as the only one that in our opinion gives the same reliable, continuous



TWO STEPS IN THE APPLICATION OF A SOLDERED BOND, SHOWING METHOD OF HEATING THE RAIL



circuit. The cost for the same conductivity is about 45 per cent of that for the outside stranded cable bond.

## Acetylene in the Car Shop

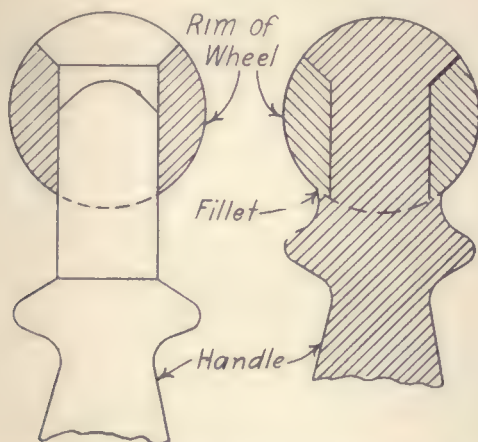
In Cutting, Softening and Welding, This Gas Proves Useful and Economical in the Shop

BY G. E. HAAR

Master Mechanic, Washington Railway & Electric Company, Washington, D. C.

In the shops of this company acetylene gas has proved useful in a number of ways and has been the source of a considerable saving of money. A few instances showing how we have utilized its properties may be of interest to readers of the *ELECTRIC RAILWAY JOURNAL*.

In cases where steel or iron is to be bent and a forge is not at hand or cannot be conveniently applied to the work, acetylene can be readily used for softening purposes. As an example, this company had a rectangular steel truck frame badly bent in a collision. To have taken it to the shop in this condition and taken it apart



TWO STEPS IN THE PROCESS OF GAS-WELDING BRASS HANDLES TO BRAKE WHEELS

for straightening and squaring would have been a time-consuming and expensive operation. A gas equipment was taken to the spot, the truck frame was heated, and by means of wrenches was promptly repaired in the yard.

Of course, there is no novelty in the use of the acetylene flame in cutting metals, and we naturally considered it in removing steel tires from wheel centers. However, we first found that if the flange was cut through and a shallow cut taken in the tread, a blow of a sledge-hammer would crack the tire through. Later we found that it was only necessary to cut through the flange, after which a short hammer blow cut the tire instantly. This is our present practice in removing tires, and the time required is practically negligible as compared with the practice formerly used.

An example of acetylene welding which interested the writer very much personally was as follows: The Public Utilities Commission of the District of Columbia ruled that the brass brake wheels which were used on a number of the cars must be provided with handles. To have changed the wheels would have cost about \$20 net per car, and the expense involved was sufficient to cause us to consider carefully other possibilities. The following plan was adopted so that brass handles were added to the wheels at a cost of about 90 cents per car, including all labor and materials.

As shown in the accompanying diagram, the rim of the wheel, which was  $1\frac{1}{4}$  in. in diameter, was drilled through for a tight fit with a  $\frac{3}{4}$ -in. projection on the

end of the handle. One side of the hole was chamfered out. The handle was then pushed into place and the brass was puddled by means of the flame, as shown, welding one side of the rim firmly to the projection of the handle. A fillet was also welded around the junction of the handle proper and the other side of the rim. After the welds had been smoothed over there resulted a wheel and handle as good as if the two had been cast together.

Another operation worth mentioning was the cutting of a 36-in. I-beam used in connection with the old power house and directly in the path of our underground construction for the new extension on Fourteenth Street from F Street. It took one man three hours to make two cuts on this I-beam, and 110 cu. ft. of oxygen and 50 cu. ft. of acetylene were consumed.

In our work we use what are designated as No. 4 to No. 10 tips, a tank containing 100 cu. ft. of oxygen, and an acetylene tank containing 225 cu. ft., or  $15\frac{1}{2}$  lb., of acetylene. The oxygen and acetylene costs about 2 cents per cubic foot.

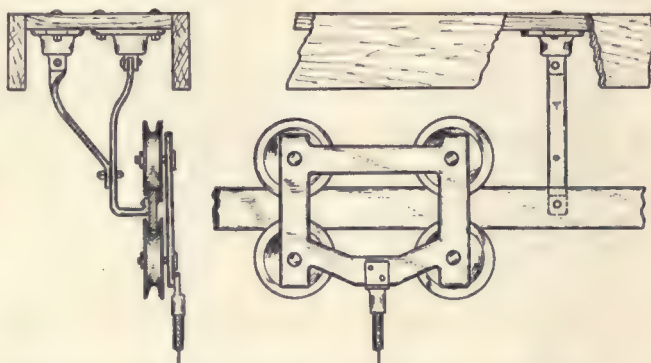
## A Movable Carriage for Current Collection

Convenient Method of Supplying Current to Cars Not Equipped for Trolley Operation

BY G. B. TANIS

Electric railway operation offers many problems which usually do not submit themselves to simple solutions. The design of a contact system for furnishing current to moving equipments in yards and shops presents a typical case, particularly when the cars are not adapted for trolley operation. Some third-rail equipments are provided with trolley poles, in which case standard overhead construction can be used. The presence of a live rail near the track is not only dangerous in a shop, but it is a hindrance to the men in doing their work.

A surface depot with which the writer is familiar was recently converted into a shop for inspecting subway cars, making it necessary to devise some scheme for



MOVABLE CARRIAGE TO SUPPLY CURRENT FOR OPERATING CARS IN THE REPAIR SHOP

delivering power to the cars. This was accomplished by substituting for the trolley wire an iron bar, on which was mounted a movable carriage, current being supplied to the third-rail shoes through a No. 0000 lead connected to the carriage which is drawn forward as the car moves along the track.

The iron bar is of 3 in. x  $\frac{7}{16}$  in. wrought iron, and extends the entire length of the shop. It is supported by brackets bolted to standard trough hangers, which in turn are bolted to the wooden trough formerly used for the trolley. The brackets are made of two  $1\frac{1}{4}$ -in. x



5/16-in. pieces of wrought iron erected as shown in the sketch. The carriage is composed of four standard trolley wheels held in position by a forged yoke of wrought iron. To this yoke the lead is connected by an ordinary terminal. The end of the lead which connects to the car shoe has a spring clip attached so that it can be easily snapped on or off as desired.

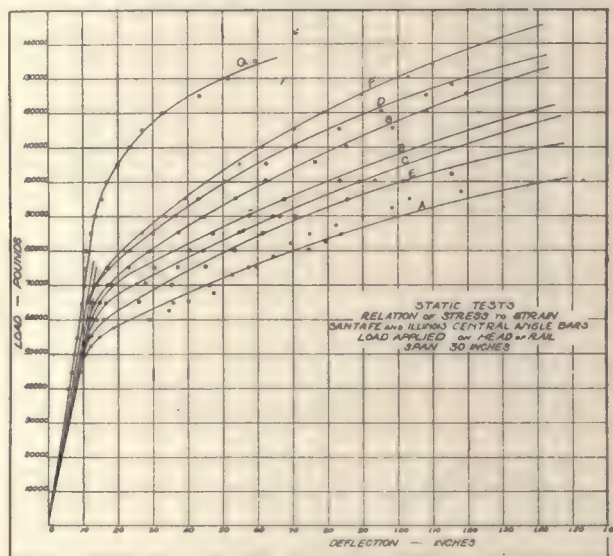
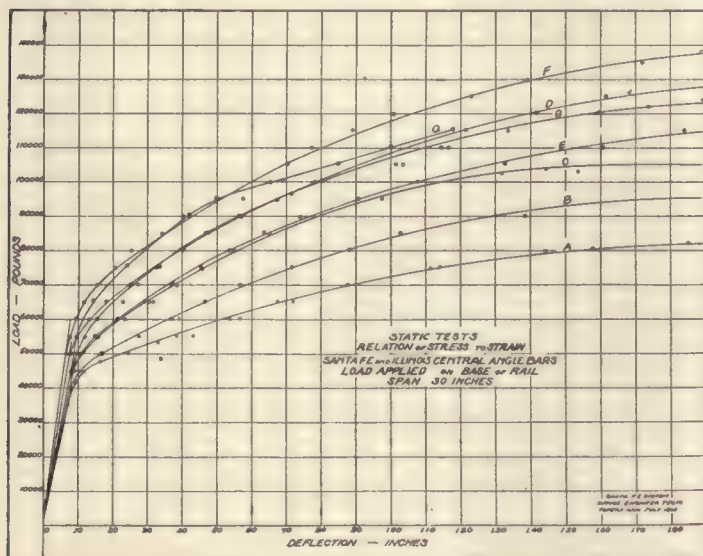
## Rail Joint Tests in A. R. E. A. Bulletin

The August, 1916, bulletin of the American Railway Engineering Association, recently issued, contains some studies by M. H. Wickhorst, engineer of tests of the rail committee, on the strength of angle bars with varying carbon content and of quenched bars, and also on the strength of oil-quenched, medium-carbon steel track bolts as compared with untreated, low-carbon steel track bolts. The material used in the test included forty-eight pairs of bars, forty-two of which were Santa Fé Railroad's experimental angles of different carbon range, and six were Illinois Central Railroad's medium-carbon quenched bars.

Both static and drop test were used. In the static test, the angle bars were bolted to two 90-lb. Santa Fé standard rail sections, about 3 ft. long, and the joint

slightly over 1 in. apart at the bottom. After the rails had been deflected so that the ends came together at the top, the bars would tend to shear the bolts on being deflected further. As a result of these tests the bars were badly distorted, a condition which is shown in a number of illustrations which accompany this report. For the low-carbon steel bolts three of the four joints failed by shearing the bolts, all failing on the third drop. For the oil-quenched bolts two of the four joints failed from shearing of the bolts, and both these two joints failed on the fourth drop. These data show that the oil-quenched bolts offer greater resistance to shear than the untreated low-carbon steel bolts.

As a result of these tests the following conclusions were drawn: 1. The strength and rigidity of the track joint are dependent on the strength of the joint bar. 2. The strength of material varies with the carbon content when other elements are constant and the material is handled in the same manner regarding heat treatment and quenching. 3. Proper quenching of the material raises both the yield point and the ultimate strength of the steel and results in a stronger joint, as pointed out in the comparison of the quenched medium steel bars with untreated bars having the same composition. 4. The strength and rigidity of the joint are influenced



RESULTS OF TESTS ON RAIL JOINTS WITH LOAD APPLIED AT HEAD AND BASE OF RAIL

was supported by heavy knife edges set 30 in. apart on the bed of a 200,000-lb. Olsen testing machine. The load was applied at the center of the joint by means of another knife edge and a suitable block to simulate wheel pressure. The bars were bolted together on the rail so as to allow a  $\frac{3}{8}$ -in. opening between the rail ends, and the bolts were stressed to approximately 20,000 lb. Care was exercised to have a good fit between the angle bars and the rail.

In the drop test the bars were bolted to 90-lb. Santa Fé rail sections as in the static tests. The joint was placed on the supports of an M. C. B. drop-test machine, using a 36-in. span. A 2000-lb. tup was used with a fall of 8 ft. 6 in., which is one-half the height required by the American Railway Engineering Association specifications for 90-lb. rail. The results of the static test with the load applied on the head and on the base of the rail are shown by the two sets of curves herewith. The letters on these charts indicate different sets of bars.

In the drop test the bars were given a succession of drops on the head or base until failure resulted. The bars were deflected on the first drop to an extent that the rail ends were usually together at the top and

to a slight extent by the strength of the bolt, both in static and dynamic tests, showing in favor of the oil-quenched, medium-carbon steel bolt over the untreated, low-carbon steel bolt.

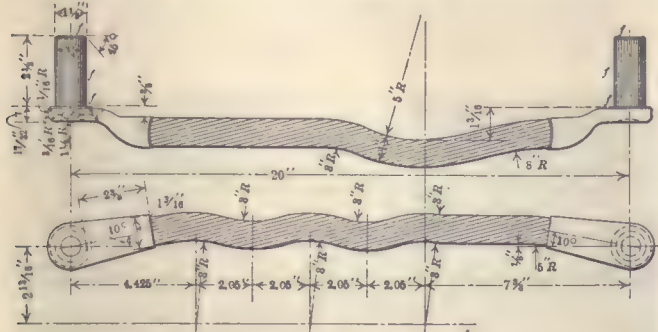
## 3,000,000 Circ. Mil Bonding for New York Subway Third-Rail

The bond shown in the accompanying illustration has been developed for the bonding of the 150-lb. third-rail which is to be installed by the Interborough Rapid Transit Company on its portion of the dual system of rapid transit of New York City. The bond is of the compressed terminal cable type, 20 in. long and made up of 127 strands having a combined cross-section of 750,000 circ. mil. Four of these bonds, placed two on each side of the rail, are to be used at each joint, giving a total cross-section of 3,000,000 circ. mil. The bonds are being made by the Ohio Brass Company, and this will be the heaviest compressed terminal bonding on record.

The web of the rail is  $2\frac{1}{8}$  in. thick which is said to be the greatest thickness on which compressed terminal bonds have been used. For installing the bonds a



special, hand-operated, hydraulic compressor has been developed. Oil is the liquid used and the pressure is raised to 45 tons before the terminal is released. By an attachment on the compressor, a tape is punched when the required pressure is reached. As the terminal is not released until the tape is punched this device insures that the bond is installed with the required 45-ton pres-



BOND TO BE USED ON 150-LB. NEW THIRD-RAIL OF INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK CITY

sure. Tests made by sawing through the rail and bond show that this pressure is sufficient to give good contact between the copper and the rail. If it should be necessary for any reason to release the pressure before the compression is complete, this can be done by opening an emergency valve.

## New Cars Unloaded Without Special Apparatus

The accompanying illustration shows the scheme used by J. L. Brown, master mechanic, Dallas (Tex.) Consolidated Electric Street Railway, for unloading a shipment of thirty-five cars. A location in the company's spur track was selected where the joints in the rails were opposite each other. The splice plates were unbolted, and the track was raised by cribbing up in



SKETCH SHOWING TEMPORARY TRACK CONSTRUCTION FOR UNLOADING CARS

the manner shown. The flat cars on which the new cars were shipped were run up to this scaffolding where a temporary connection was made with the nearby trolley wire, and the cars were unloaded by their own power. Three men were kept busy knocking off the blocks which held the cars on the flats, and two motormen ran the new cars to the car-house. With this method of operation the average time required to transfer a car from the flat car to the carhouse was sixteen minutes.

A machine for forming elliptic springs has recently been put on the market by Joseph T. Ryerson & Son of Chicago, Ill. It is known as the "Riley Universal Elliptic Spring Forming Machine," and is primarily designed for railroad spring shop use. In the operation of this machine, the hot spring leaf, is formed next to the cold plate against which it fits in the spring, thus giving an accurate camber to the hot leaf.

## Railway Uses Old Sandstone Blocks for Paving Foundation

In doing its repaving, the Topeka (Kan.) Railway is using as a base, 6-in.x6-in.x8-in. Colorado sandstone blocks which have been in use in the paving since 1886. These old blocks would otherwise have been thrown away or broken up for use in concrete.

In paving a street the track is shifted to one side, and a 2-in.x9-ft. trench is dug. The sandstone blocks



GROUTING SANDSTONE BLOCKS ON TOPEKA (KAN.) RAILWAY

are laid on a 1-in. layer of cinders and thoroughly grouted. One of the accompanying illustrations shows a gang of laborers mixing the cement and brushing it into the crevices between the blocks, while the other picture shows the sandstone blocks after the grouting has been done. After the completion of the grouting the track is moved back onto this foundation and the space around the ties is filled in with Joplin chats. Spread over this foundation is a 3-in. course of concrete which joins on either side the concrete foundation installed by the city. On top of this the regular sand cushion and brick block paving is laid the full width of the street.

The Topeka Railway has 10 miles of track on streets



SANDSTONE FOUNDATION READY FOR INSTALLATION OF TRACKS TOPEKA (KAN.) RAILWAY

having sandstone block paving, and in the future it is planned to do the repaving in this manner. The new paving is permanent in character and less expensive than solid concrete, and it is the opinion of the company that it will cushion the rail better than the solid type of construction.



## A High-Voltage, Overload Relay for Alternating-Current Circuits

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently placed on the market type HB overload relay for high voltage alternating-current circuits of any frequency.

This relay consists of a strongly built solenoid mechanism which operates a timing and circuit-closing element through a micarta chain of such length as to provide ample insulation for the voltage in use. There is no lost motion in the chain as it is constantly in tension, the action of the solenoid raising a weight on the contact mechanism. For voltages up to 44,000 the chain consists of twelve links. Twenty links are provided for voltages up to 66,000, and thirty links up to 110,000 volts. The links may be removed to shorten the chain down to a minimum of one link for each 6600 volts.

The relay coil is inserted in the high-voltage line, but the contacts and timing parts are thoroughly

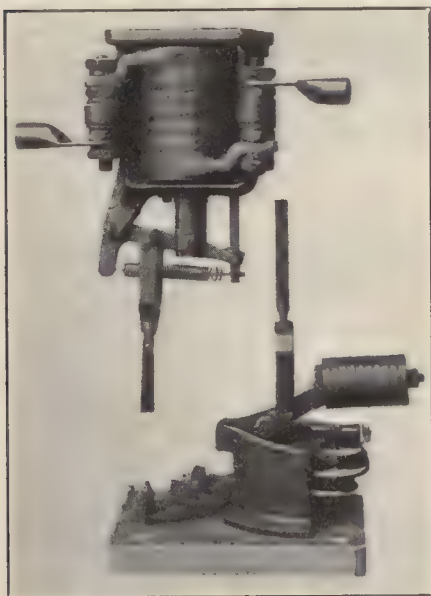
insulated and can be handled, adjusted or tested without disconnecting the feeder. The coil can be mounted on a disconnecting switch or choke coil and the use of separate insulators avoided, while the contact mechanism can be mounted in the position most convenient.

This HB relay is furnished in two forms—one having an inverse time element, the other a definite time element. The

inverse time-element relay can be set to act practically instantaneously. In this form of relay the solenoid and chain are opposed in their motion by a bellows with an adjustable valve. The valve has a small numbered dial which permits of any setting between a maximum time element of about twenty seconds at 25 per cent overload and a minimum of about one second at the same overload. With greater overload the relay acts in a shorter time.

In the definite time-element relay the same kind of bellows and valve are used as for the inverse time limit, but the solenoid chain does not act directly on it. As these relays are controlled by bellows they are not as accurate as to time element as magnetically damped relays. Their time element will be found sufficiently accurate to afford protection on the circuit to which applied, though selective protection with regard to other circuits in the system cannot always be satisfactorily obtained.

This relay is intended for mounting on a disconnecting switch or other support on the high-tension line. One relay is required to protect a single-phase circuit, two relays for a two-phase or three-phase ungrounded neutral circuit, and three relays for a three-phase grounded neutral circuit.



SOLENOID MECHANISM OF OVERLOAD RELAY; BELLOW AND VALVE BELOW

## Girder Rails Replaced by T-Rails in Cambridge, Mass.

The Boston Elevated Railway in reconstructing 2200 ft. of track on Massachusetts Avenue, Cambridge, Mass., is replacing 9-in. girder rails with 95-lb. Lorain Steel Company, section No. 400, T-rail, 7 in. high.

The accompanying illustrations show the work in progress. Creosoted hard pine ties measuring 7 in. x 7 in. x 7 ft. are laid with 2-ft. spacing on a 3-in. founda-



BALLASTING T-RAIL TRACK IN CAMBRIDGE, MASS.

tion of stone ballast. The tracks are laid with tie rods spaced every 5 ft., and four lag screws per tie hold the rails to the ties. Crushed stone is filled in between the ties to a depth of 2 in. and tamped, pneumatic tie tampers being used. On top of the crushed stone is a concrete slab, the mixture being one part cement to six parts gravel taken from the street. In mixing only a little water is used.

A layer of beach sand, 1 in. to 1½ in. in thickness, is spread over the ties to form a cushion for the 5-in. granite paving blocks. These are laid in an arch form so that the paving in the center of the track is level with the top of the rail. This is a crown of 1¼ in. The paving is then flooded with thin grout and swept. On completion of this work there will be about 10 miles of this general type of track construction on the system.

## Conductor's Seat Made Adjustable

The adaptation of any one of the conductors' folding seats that was on the market to the different types of cars of the Northern Ohio Traction & Light Company, Akron, Ohio, was found to be impractical, and accordingly P. J. Wood, master mechanic, designed and built one of his own which is now being manufactured and sold by the Cleveland Trolley Supply Company, Cleve-



THREE POSITIONS OF SEAT USED BY CONDUCTORS ON THE NORTHERN OHIO TRACTION COMPANY



land, Ohio. This seat has been adapted to an ordinary prepayment-fare stand. It consists of a malleable iron bracket supporting the seat itself and attached to a pipe standard. The distance between this standard and the standards supporting the fare box is adjustable, and the position of the seat bracket on its supporting standard can also be varied. The supporting bracket revolves about the pipe standard, and its position may be fixed in the space back of the fare box or swung around in position for the conductor, or it may serve to obstruct the exit aisle.

The seat proper can be adjusted to any height within the range of the length of the screw upon which it is mounted, and may be fixed in a horizontal position, or swung to a vertical position on either side of the bracket as shown in the accompanying illustrations. The latching is accomplished by a tip on the casting which supports the seat. This fits into three different slots in the end of the horizontal member of the malleable iron bracket proper.

### Improved Safety Switch

An inclosed, theft and fool proof, safety switch designed to replace the dangerous, exposed switch on 600-volt railway circuits has recently been placed on the market by the Western Electric Company, Chicago, Ill.

As shown in the illustration herewith, this switch is inclosed in a metal box provided with a hinged cover which is held closed by a spring latch. The switch



IMPROVED SAFETY SWITCH

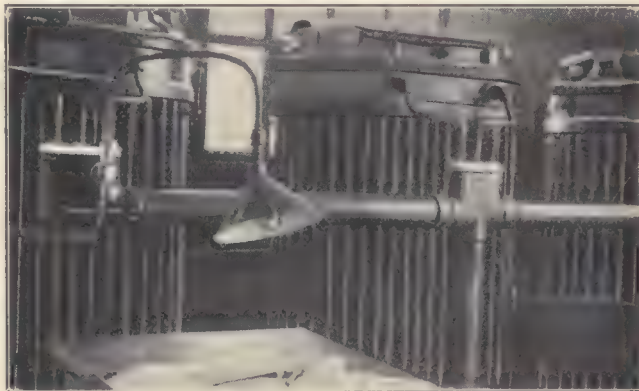
terminals and fuses are under lock and key, and while the current can be turned on or off by means of the handle outside the box, the current carrying parts and wiring remain inaccessible. This prevents the theft of current, which is generally accomplished by wiring around the meter. The switch mechanism is of a quick-break type. When the door is closed, a gasket in the lid renders the box fire and waterproof. This switch has a maximum capacity of 600 amp. on 600 volts.

An innovation in country elevator structures has been introduced on the Illinois Traction System at Evans, Ill., where there has been erected a concrete and steel tank elevator. A round steel tank 26 ft. in diameter, 45 ft. high and weighing 40,000 lb. is divided into four bins, each holding 3000 bushels. The first story or working floor, under the tank is of concrete reinforced with steel and the structure is rat and mouse proof, as well as fireproof. This is one of twenty-five grain elevators ranging in capacity from 10,000 to 50,000 bushels along the lines of the Illinois Traction System.

### Special Outlets for Conduit

The conduit wiring for transformers as shown in the accompanying illustration is a feature of the South Deerfield (Mass.) substation of the Greenfield Electric Light & Power Company, which supplies power for the Connecticut Valley Street Railway at this point by use of a motor generator set.

The installation consists of three 100-kva. General Electric oil-cooled units, delivering current at 4600 volts for local distribution and receiving 13,200-volt energy from the Greenfield company's local transmission net-



CONDUIT OUTLET WITH RECEPTACLE FOR PILOT LAMP AND CONNECTION FOR OPERATOR'S DESK LAMP

work. Both primary and secondary leads are wired in pipe duct, with Crouse-Hind "condulet" fittings, the arrangement providing an unusually compact installation. A special feature is the provision of an outlet in one of the "condulets" over the operator's desk to carry a lamp feed from the substation lighting circuit supply. The outlet also carries a receptacle holding a 10-watt lamp which serves as a pilot when the station is otherwise darkened for that portion of the night after a railway motor-generator set in the room has been shut down. A swinging lamp bracket over the desk is threaded into the outlet for convenient handling and the provision of a metal reflector and 40-watt lamp enables the operator to read the watt-hour meters installed on the switch-board 12 ft. away without carrying lamp cord and portable unit about the substation.

### Delivering Hard-Road Material on the Ohio Electric

Crushed stone for hard roads or other purposes is being handled in large quantities by the Ohio Electric Railway, Springfield, Ohio. This material is delivered from quarries located on this company's lines and from connecting steam railroads. Cars loaded with crushed stone are usually handled by the regular freight trains, but in a number of instances special switching service is required to make deliveries. The crushed stone is loaded into side-dump cars, flat-bottom gondola cars and hopper-bottom gondola cars. The hopper-bottom cars are dumped into pits on side tracks, the gondola cars are set out on side tracks, the side-dump cars are delivered at any specified points along the right-of-way, and the material is unloaded by hand shoveling. When side-dump cars are unloaded from the main line, they are handled by a switching locomotive between the regular scheduled trains. An embankment along a highway is the most desirable location for unloading crushed stone from side-dump cars. The convenience of deliveries made in this way has been a large factor in the railway's obtaining this class of freight.



## NEWS OF ELECTRIC RAILWAYS

### MR. CLARK MAKES PLEA FOR FAIR TREATMENT Course Outlined Necessary to Restoring Confidence in Municipal Attitude Toward Portland (Ore.) Company

C. M. Clark, Philadelphia, Pa., chairman of the executive committee of the Portland Railway, Light & Power Company, Portland, Ore., was the guest of honor and the chief speaker at the weekly luncheon of the Progressive Business Men's Club of that city on Oct. 12. Mr. Clark's principal topics were the jitney, the attitude of the Pacific Coast toward the Eastern investor and the competition in the lighting field in Portland. He said that there was a growing concern among Eastern investors over the apparent lack of interest on the Pacific Coast in the rights of those who have furnished funds for the development of the resources of the West, and he referred to the need for refinancing which will present itself to the company through the maturity of \$5,500,000 of notes on May 1, 1917. He said that while the Pacific Coast was the great home of the jitney, he thought that the climate has very little to do with its prevalence there. The reason for its existence was the way Pacific Coast cities were governed and the lack of thought or responsibility in the public mind to property interests and to franchises already given. The chairman of the meeting had made that suggestion. Otherwise, Mr. Clark said, he would not have spoken of it, but there was an obligation of a municipality to a franchise contract under which vast sums of money had been invested. He thought the chairman made a good point and was glad to enlarge upon it. He considered the inadequate control of the jitney on the Pacific Coast to be a reflection upon the government of the Pacific Coast cities.

In Mr. Clark's opinion, the city of Portland or any other city could never be served adequately by the jitney service. He did not believe any of the gentlemen present thought it could, nor did he think the Council of the city of Portland thought that it could. If there was any question as to the correct answer to that interrogation, undoubtedly the proper thing for the Council of Portland to do was to grant a franchise to some responsible jitney organization and let them try it out. In granting such franchise the very smallest consideration for fair play and for common municipal honesty would require that any ordinance for a single jitney or a combination of jitneys to operate in Portland should contain restrictions, regulations, taxation, etc., similar to those under which the Portland Railway, Light & Power Company operated. That was the least obligation which the city government of the city of Portland owed to vested interests. All that the stockholders of the Portland Railway, Light & Power Company wanted from the city and the people was fair play and the same treatment as was received by its competitors. If the Council granted a franchise to a jitney organization or to individual jitney drivers, giving them privileges and concessions and conditions which were decidedly more favorable than those received by the Portland Railway, Light & Power Company, that company would expect exactly those same concessions.

In referring to the financial situation, Mr. Clark said that to his mind it was the crux of the whole matter. The financial history of the past few years of the Portland Railway, Light & Power Company had been absolutely disastrous. Since 1913 practically the entire surplus earnings had been taken away from the company through absolutely no fault of its own, except that the company had expanded to take care of the growth of the city of Portland which was indicated by its previous history. That was a mistake and the company owned up to it. The bonds of the company, which three years ago were worth 97½, Mr. Clark bought that week for 70. The two-year notes of the company, which come due next May, \$5,000,000 of them, were offered at present at 90. The stock, which was in the

seventies and eighties, before assessments of 10 per cent were called, was now at nine, after payment of \$10 a share in assessments. He was asked constantly the question, "What under the sun is the matter with Portland?"

As to prospects Mr. Clark said that if the jitney was removed the company would immediately get back the business which belonged to it before. If good times came again the company would get back what it lost through the industrial depression, and could then go ahead and attend to business. As for the competition of the Northwestern Electric, the Portland Railway, Light & Power Company would never get back its loss from that source, but with the growth of the demand for electric light and power it may be able to build up enough business for both, although it would probably take a great many years to do it.

### NIAGARA & EASTERN TO REAPPLY FOR CONSTRUCTION RIGHTS

Despite the action of the Public Service Commission for the Second District of New York, which has denied a certificate of convenience and necessity to the Niagara & Eastern Railroad, Lockport, N. Y., for the construction of an electric railway to connect the Buffalo, Lockport & Rochester Railway with the Niagara frontier at a point where it is proposed to build a new international bridge across the gorge at the Devil's Hole, Judge Charles Hickey, Lockport, president of the line, says a modified application will immediately be made to the commission.

The construction of the proposed line is embodied in a comprehensive plan which would involve the expenditure of several millions of dollars in electric railway properties throughout western New York and in Canada between Toronto, Ont., and the Niagara frontier. Surveys have been made and options have been obtained for a tentative right-of-way between Hinman, N. Y., on the Buffalo & Lockport division of the International Railway, and a point on the Niagara gorge near the Devil's Hole. Property has been bought on the American and Canadian sides of the gorge near this point for abutments for the proposed international bridge.

The road is being promoted as a connecting link in the new transcontinental line, involving the extension of the Canadian Northern Railway from its present eastern terminus at Toronto, Ont., to the Niagara escarpment, where a new international bridge would connect it with the proposed Niagara & Eastern at the Devil's Hole, then to Hinman and Lockport and over the Buffalo, Lockport & Rochester Railway to Rochester, where it would connect with other eastern systems.

Commissioner Devoe P. Hodson, Buffalo, who wrote the commission's majority opinion, from which only Commissioner William Temple Emmet dissents, says that the possibility of consummating the connections across the Niagara gorge and with the eastern terminus of the Canadian Northern in Toronto, 80 miles away, is too remote to be considered in its present application. Without this connection the commission finds that there would be no public necessity for the Niagara & Eastern line as a whole from Lockport to the gorge. While intimating that the commission might consider a future application for a certificate for that part of the line which would connect the Buffalo, Lockport & Rochester Railway with the International Railway and the Erie Railroad at Hinman, Commissioner Hodson finds the commission is without power under the law to separate the present application into two parts.

President Hickey of the Niagara & Eastern Railroad is quoted as stating that the new line will be financed by interests identified with the International Railway, Buffalo, and declares there will be no delay in making another application to the commission in a somewhat modified form.



## ADDITIONAL TIME IN TACOMA CASE

## Mayor of Tacoma Attacks Motives of Tacoma Railway &amp; Power Company in Seeking Relief from Franchise Provisions

By an order of the Public Service Commission of the State of Washington, the city of Tacoma has been granted an additional twenty days in which to answer the complaint of the Tacoma Railway & Power Company, in which the company asks to be relieved by the Public Service Commission from various franchise obligations. Mayor Fawcett, of Tacoma, quoting from the petition of the company the paragraph setting forth that "it is impossible for the plaintiff to continue to operate its street railway lines for a 5-cent fare throughout the limits of the city of Tacoma, to maintain its present service," etc., answered the charge of Louis Bean, manager of the company, with the rejoinder that the Stone-Webster subsidiary, in its complaint, is attempting to bring about an increase in its fares on lines extending to outlying points.

Mr. Bean, in answering the statement made by the Mayor, said in part:

"In the statement appearing in local papers, with reference to the so-called 'relief petition' of the Tacoma Railway & Power Company, the Mayor has stated in effect that the company was seeking to raise fares to Fernhill, Larchmont, South Tacoma, Point Defiance, etc. His statement is entirely without foundation. It is our understanding that at this time the State law prescribes a 5-cent fare within the limits of incorporated cities. For the information of the public, we present herewith our prayer in petition for relief:

"Wherefore, the plaintiff craves that a citation be issued directed to the city of Tacoma, requiring it to answer this complaint, and that a hearing thereon be had; that an order be entered relieving the plaintiff from any obligations to pay any gross earnings tax, and from contributing to the cost of bridges, to pave or pay therefor; from maintaining and repairing streets; from furnishing any free transportation, and that the plaintiff be relieved from any further provisions of the franchises under which it operates, except to give adequate and sufficient service at fair and reasonable rates."

Mayor Fawcett, in return, said in part:

"Manager Bean says he did not ask the commission for increased fares. Stone-Webster's manager would not be so crude as to blurt out: 'We want 10-cent fare to Fernhill and South Tacoma.' He knows what a row that would have made. Mr. Bean publishes the prayer of his petition to show he didn't ask it. Please note the last line of the prayer: 'at fair and reasonable rates!' What does that mean? Hasn't this city been entertained ever since the Fernhill fight with mournful bleatings of street railway officials that a 5-cent fare is not a 'fair and reasonable rate' to Fernhill and other outlying districts?

"Again, in its plea to the commission, after recounting the things the franchises require the company to do, it says: 'It will be absolutely impossible for the plaintiff to comply with such provision and to charge only a 5-cent fare within the corporation limits of the city of Tacoma.' Oh, no! Mr. Bean did not ask for a fare boost. He just fixed it so the commission would either have to commit hari-kari or else give it to him as the only solution to his company's distress. The people have got to elect a Legislature that will wipe out the Washington Public Service Commission."

City attorneys Dan F. North of Bellingham, William A. Johnson of Everett, Hugh M. Caldwell of Seattle, J. M. Geraghty of Spokane, City Attorney Harmon and Assistant Attorney Carnahan of Tacoma, together with Mayor Fawcett and the Tacoma City Commissioners met in secret session in Tacoma recently to perfect plans to unite against the company's petition. If the Public Service Commission decides against the city, a writ of prohibition will be sought in the Superior Court at Olympia, thus taking the question out of the hands of the Public Service Commission. If this defense is lost, the city of Tacoma will then have to answer the complaint before the Public Service Commission.

## IMPORTANT SUBURBAN FRANCHISE RENEWED

## Blue Island (Ill.) Grants Twenty-Year Extension of Rights to the Chicago &amp; Interurban Traction Company

The Chicago & Interurban Traction Company, which operates an interurban line from Vincennes Avenue and 119th Street, the city limits of Chicago, to Kankakee, Ill., has accepted a new ordinance passed by the City Council of Blue Island extending its rights in that city for a period of twenty years from the date of passage of the ordinance. The former ordinance, which was originally granted to the Englewood & Chicago Electric Street Railway and the only franchise of brief duration held by the Chicago & Southern Traction Company when the present company acquired its property outside the city of Chicago in 1912, expired in February, 1916.

The acquisition of the extension franchise is of particular significance to the company in that its rights in Blue Island were attacked by the city authorities shortly after the organization of the Chicago & Interurban Traction Company in 1912, and recourse to the courts was necessary to prevent interference with the operation of the company's cars. The new ordinance disposes of all matters in controversy between the company and the city.

Reconstruction of the company's double track lines will be carried out under a three-year program, with 91-lb. 7-in. T-rail on wood ties set in concrete, with furnace slag or crushed stone foundation and granite block paving. Specifications are included in the ordinance. The tracks in Burr Oak Avenue and Western Avenue are to be reconstructed in the first year, the Calumet Grove line the second year, and the Vincennes Avenue tracks the third year. The company will furnish on all of its poles on Western Avenue and on certain poles on Burr Oak Avenue and Vincennes Avenue brackets to carry lights to be furnished by the city, and wires for the police and fire-alarm systems.

Service regulation by yearly terms is provided for by agreement between the president of the company and a representative of the city to be appointed by the City Council. If the two cannot agree, an arbitrator is to be appointed by the City Council and the president of the company, and the findings of a majority of the arbitration board thus created will bind the company, a thirty-day period being given in which to carry new schedules into effect. It is intended that the first schedules thus established shall go into effect about Jan. 1, 1917. In the meantime the schedules are to be as prescribed in the ordinance, the week-day schedule varying from a ten-minute headway between 6 a. m. and 7:20 a. m. and 4:30 p. m. and 6:40 p. m., with a twenty-minute headway during the middle of the day to a maximum headway of eighty minutes between 1:30 a. m. and 4 a. m. The present fares remain unchanged.

In the event of annexation of the city of Blue Island to the city of Chicago, the company agrees to sell its lines within the annexed territory to the Chicago City Railway.

## CITY AND COMPANY AGREE ON EXTENSIONS

M. E. Sampsell, president of the Seattle-Renton Railway, operating in Seattle, Wash., after a recent conference with the City Council of that city, agreed to begin the Genesee Street extension of the Rainier Avenue line as soon as possible. This promise was made in consideration of concessions relative to paving between rails of the line. According to the terms of the franchise of the company, the Genesee line must be completed within a year from last June, when court proceedings over the Seattle, Renton & Southern Railway ceased. The Genesee line will be single track. The company will not have to pave east of Forty-seventh Street. The City Council granted practically every concession asked by the railway. According to present plans the company will proceed with an early expenditure of approximately \$150,000, making it possible, when the work is completed, to reduce the running time from Renton to the Seattle terminus by ten minutes. Mr. Sampsell made it plain to city officials that his company desires to work harmoniously with the city. Mr. Sampsell has been negotiating with the city for common user rights on Fourth Avenue for cars on the Seattle Municipal Railway.



### UNION RESTRAINED IN MISSOURI STRIKE

The original restraining order in connection with the strike of the employees of the Springfield (Mo.) Traction Company, noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 7, page 741, preventing the union from striking was dismissed by Judge Woodrough. His opinion was that the company should arbitrate, not because an employee had been unjustly discharged, but for the satisfaction of the remaining members of the union. The company immediately offered to arbitrate. The union, however, refused arbitration and demanded the immediate reinstatement of the discharged employee with pay from the date of discharge. The company refused this demand and the union employees struck. Judge Pollock then granted a temporary restraining order against the union and the union sympathizers from interference with the operation of the traction company. This temporary writ of restraint was returnable on Oct. 20 before Judge Van Valkenburg, who rendered an opinion on Oct. 23 granting the traction company a temporary injunction against interference by the union or union sympathizers. The company is now operating 75 per cent of the regular number of cars, with service on all but two minor lines.

### ANOTHER PLEA FOR LENIENCY

Donald C. Barnes, manager of the Everett Railway, Light & Power Company, Everett, Wash., in a letter written to petitioners for an extension of the Summit Avenue line of the company, said in part:

"We have your petition for the extension of our lines on Summit Avenue, and take this opportunity to present to you our position in this matter. The street railway business in this city has never been profitable, and unless the company receives some relief from its franchise obligations, such as the rescinding of free transfers, paving requirements, etc., or freedom from unregulated jitney competition, the present business cannot be continued. The results of operation of last year were: gross earnings, \$97,948; operating expenses, \$94,384; balance, \$3,563; taxes, \$12,837; deficit, \$9,937. In other words, the revenue was not sufficient to pay operating expenses and taxes, with no provision for interest and the sinking fund.

"It is impossible to raise further funds for extensions until the money already invested can be made to show some returns. The city now has an ordinance which levies an annual license tax of \$400 on peddlers with motor vehicles. This was passed to protect the merchants who have established business here and are entitled to this protection. The case of the jitney operator is analogous. He is a peddler who, paying only a nominal tax and incurring no obligations of service, comes in to-day, skims the cream of an established business, and is gone to-morrow. He runs his vehicle only on the streets which the street railway has helped to pave, and duplicates the service already provided. The time is soon coming when the public must choose between the two, and the only way you can secure extensions and an adequate system of transportation is by directing your efforts to the elimination of jitney competition."

### COMMISSION UPHELD IN IMPROVEMENT CASE

The Public Service Commission for the First District of New York has recently been upheld by unanimous decision of the Court of Appeals as to its powers to direct public service corporations to undertake "reasonable improvements." This decision reverses a unanimous decision of the Appellate Division, First Department, which annulled an order of the commission made on March 19, 1915, directing the New York & Queens Gas Company to extend its mains and supply service from Bayside, Queens, to Douglaston and Douglaston Manor, sections without illuminating gas. Judge Cuddeback, writing the opinion of the Court of Appeals, holds that the courts have no right to exercise administrative powers such as those possessed by the Public Service Commission. The commission directed the extension of the gas mains after several hearings. The gas company appealed. It contended that the cost would be greater than any financial return possible in the succeeding few years warranted. The Appellate Division upheld this view, and describing the order of the commission as unreasonable,

annulled it. The Court of Appeals, however, has decided that the order of the commission was reasonable and should stand. Counsel for the commission contended in the latter tribunal that the lower court had assumed to itself powers and duties belonging to the commission. This view the court took, Judge Cuddeback holding that the Appellate Division had the power only to determine that the commission's order was unreasonable in that it was "an unlawful, arbitrary or capricious exercise of power." He held further that if the decision of the Appellate Division were allowed to stand it would "go far toward defeating the efforts of the Legislature to establish agencies to regulate the great public service corporations."

### NEW WORKING AGREEMENT IN CHATTANOOGA

**Brief Review Is Presented of Negotiations Leading Up to Settlement Arranged on Oct. 7 for a Year and a Half**

The Chattanooga Railway & Light Company, Chattanooga, Tenn., has made a new working agreement with its employees, dated Oct. 7, to be effective for a year and a half. The agreement is on the open shop basis. It is the outcome of negotiations in progress since last August and differs materially in several respects from the conditions of the working agreement incorrectly reported in the issue of this paper for Sept. 9. A brief review of the labor situation in Chattanooga follows:

The Chattanooga Railway & Light Company has always operated on the open shop principle. Early in August representatives of the Amalgamated Association attempted to unionize the property and force a closed shop. The company had, of its own accord, increased the wages of the platform men effective on Aug. 1, and most of the men were satisfied with the wage schedules and working conditions. The Amalgamated representatives did not meet with much success. With the assistance of local unions, principally the machinists' union, however, they commenced to intimidate the platform men in an endeavor to force them from the cars or join the union. On the evening of Aug. 21 a mob of several hundred union men and sympathizers commenced pulling them from the platforms of the cars in the down-town districts. Considerable disorder followed and the Commissioner of Police put in a riot call and called out the fire department to clear the streets. The trouble resulted in a walk-out, and it was late that night before all the cars could be put back in the carhouses.

The day following, negotiations were opened through the Mayor of the city and a conference was held between the local labor union and officials of the company. At that time the men agreed to return to work, and the company agreed to recognize the men as heretofore on the open shop basis and drew up a new working agreement. Service was resumed and has continued uninterrupted ever since that date. About Oct. 1, however, the officers of the Amalgamated Association again appeared upon the scene and insisted upon a closed shop agreement. This was declined by the company and it looked for a time as if there would be more trouble. The majority of the platform men, however, satisfied with their working conditions and the wage schedule, which had just been increased, refused to call a strike and the Amalgamated officers left the city.

On Oct. 7 the company made a new working agreement with its employees to be effective for one year and a half. This agreement is on the open shop basis, the company agreeing merely not to discriminate against those of its employees who are members of the union.

The wage scale remains the same as fixed on Aug. 1, prior to the walkout. It is as follows: first six months, 18 cents an hour; second six months, 20 cents an hour; second year, 22 cents an hour; third year, 23 cents an hour; fourth year, 24 cents an hour; fifth year and over, 25 cents an hour.

The working agreement is for a period of one year and a half. Arbitration is provided for as a means of adjusting the question of wages only, which the company agrees to advance if the earnings warrant. The employees are to ask arbitration on this point if they cannot agree with the company, but once fixed, wages are to remain in force for one year thereafter. All other working conditions remain the same as they were bulletined and in effect prior to the date of making the new agreement.



### BUFFALO LINES CO-OPERATE IN POWER MOVEMENT

The International Railway, Buffalo, N. Y., and the Niagara Junction Railway, Niagara Falls, N. Y., are co-operating in the movement for greater diversion of water from the Niagara River for power development. Maj. Harry Burgess, of the United States lake survey, who held a hearing recently on the necessity for greater power development, received formal statements from the two electric lines relative to the acute shortage of power. The Ontario Hydro-Electric Commission has stopped the exportation of one large block of energy to American consumers and threatens to stop all exportation by the Canadian-Niagara Power Company, Ltd. This would have a serious effect upon the two railways mentioned previously as well as upon other large users of Canadian power along the Niagara frontier. With the advent of the operation of the International Railway's new double-track fast line between Buffalo and Niagara Falls next summer the company will require additional current, and increased business on the Niagara Junction Railway has forced that company to seek additional power.

### NEW EXPRESS TERMINAL FOR DALLAS

J. F. Strickland, president of the Texas Electric Railway, has purchased an entire block of ground bounded by Young, Jefferson, Market and Wood Streets, Dallas, Tex., near the new \$5,000,000 passenger terminal station of the steam railways for \$175,000, and will erect a commodious electric express terminal thereon. This new express terminal for all electric lines entering Dallas will be the largest terminal of its kind in the world, according to Burr Martin, general manager of the Texas Traction Company and the Southern Traction Company, and Louis Horner, president of the Electric Express Company. Messrs. Martin and Horner are now working out plans for the building and trackage facilities from the interurban lines on Jefferson Street.

### TRAFFIC REPORT AT ROCHESTER

Bion J. Arnold, who has been acting as consulting engineer of the Chamber of Commerce of Rochester, N. Y., on the local railway situation, has just presented a report. He recommends (1) rerouting, (2) improvements in operation to accelerate traffic, (3) more strict traffic regulations, (4) street widening and new bridges, (5) improvements in physical property and (6) track extensions. The improvements in operation recommended include double berth operation at downtown crossings, more rapid acceleration, substitution of near-side for far-side stops, increase in stop spacing and front-end exit. The improvements in physical property include alterations in car platform arrangement to facilitate loading, more destination signs and electrically operated track switches at certain points. The proposed extensions include a suggestion that the abandoned Erie Canal has possibilities for the use of a high-speed interurban entrance to the city.

**Buffalo Tax Review Case.**—The City Council of Buffalo, N. Y., has appropriated \$20,000 to be used by the law department in defending the action brought by the International Railway for a review of its special franchise assessment and has authorized the corporation counsel to spend up to \$50,000 to defend the case. The Council has failed to approve the corporation counsel's request for an additional \$5,000 with which to start an action against the International Railway to determine whether or not the rate of fare in Buffalo should be reduced from 5 cents to 4 cents.

**Dynamite Exploded in New York Subway.**—A charge of dynamite which injured two persons, tore up a rail, and blew a hole 18 in. deep in the cement bed of the track was set off at 4.37 a. m. on Oct. 25 at the southern end of the platform of the subway station at 110th Street and Lenox Avenue, New York. The police asserted that in their opinion the dynamite was set off by persons sympathizing with the strike of Interborough Rapid Transit Company employees, though they said they had no evidence to connect the crime with any individual. Of the two persons injured one was the ticket agent, who was cut by glass. The other was a negro who was descending the steps of the south end of the station.

**Selection of Third Cleveland Arbitrator Up to Court.**—The two members of the board of arbitration, selected to settle the dispute between the Cleveland Railway and the city of Cleveland over the power contract with the Cleveland Electric Illuminating Company, failed at their final meeting on Oct. 23 to agree upon a third member. The selection will be made by Federal Judge John M. Killits of Toledo. Engineer Joseph Alexander represents the company and Attorney T. L. Sidlo represents the city. Each of them had offered a score of names for consideration. The company suggested A. B. Du Pont among others. He represented the city in a former arbitration. Attorney Sidlo asked for more time, but finally agreed to place the matter in the hands of Judge Killits at once.

**Plans Made for Restoring Service in Yonkers.**—Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., and of its subsidiary, the Yonkers Railroad, notified Mayor James T. Lennon on Oct. 25 that he would operate cars in Yonkers on Oct. 26. When a similar attempt was made on Oct. 1 cars were wrecked. The cars were then withdrawn until now Yonkers has been without electric railway service for nearly nine weeks. Mayor Lennon, apparently having the earlier disorder in mind, issued a proclamation reviewing the obligations of the citizens and warning them of the dangers which attach to participation in disorder. It is understood that Mr. Whitridge has induced many of his old employees to return to work, and with these will be sent new crews to acquire the experience demanded by the fifteen-day ordinance.

**Referendum Asked on Strike Prevention Plan.**—The Chamber of Commerce of the United States, in accordance with instructions given by the Board of Directors, has been requested to submit to its constituent members, in the form of a referendum, the plan suggested by the Merchants' Association of New York for preventing the interruption of the operation of public utilities. The principle indorsed by the association is based upon the establishment of a contractual relation between employers and employees upon public utilities. Upon this basis a plan was worked out in detail by Henry R. Towne. The association accepted this plan, but expressed its willingness to give its approval to any other practical method of insuring the freedom of public utilities from interruption. Copies of the pamphlet containing the plan and the resolutions of the board of directors have been sent to all the commercial organizations of the United States. A digest of the plan was published in this paper for Sept. 30, page 692, in connection with the account of the strike in New York.

**Additional Transit Facilities Urged for Brooklyn.**—With a letter urging citizens of Brooklyn to support the proposals of the Public Service Commission for the First District of New York for the betterment of transit conditions in Brooklyn, the Committee of One Hundred has presented the commission's comprehensive program of rapid transit for all Brooklyn. The program suggests the construction of a Livingston-Clinton Street subway, with an Ashland Place connection, and the construction of many crosstown lines from Long Island Sound to the Atlantic Ocean, all at a cost of \$14,000,000. The Public Service Commission recommends negotiations with the Brooklyn Rapid Transit Company toward a fixation of a price at which the existing railroads may be taken over, and suggests that the matter of valuation be referred to a committee of ten, five to be appointed by the railway company and five by the Public Service Commission. In calling the attention of the citizens of Brooklyn to the proposals, the committee urges that the extra tax of 1 per cent a year on the value of real-estate holdings for a term of ten years will be more than repaid by the benefit to such real estate.

### PROGRAM OF ASSOCIATION MEETING

#### Illinois Electric Railways Association

The next meeting of the Illinois Electric Railways Association will be held at the La Salle Hotel, Chicago, Ill., at 10 a. m. on Nov. 17. The program will be announced later. It is expected that the topics presented will include one-man cars, charges for baggage, the safety code, personal injury and damage claims and regulation by commissions.



## Financial and Corporate

### EARNINGS STATISTICS FOR JULY

#### Returns for 1916 and 1915 Indicate Lack of Improvement in West—Operating Expenses and Taxes Advance

A comparison of electric railway statistics for July, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicate some improvement in the electric railway business of the East and the South, together with a depression in the West, while there has been an advance in the operating expenses and taxes of all districts. Returns representing 7129 miles of line of companies scattered throughout the country show an increase in operating revenues of 5.54 per cent, in operating expenses of 5.49 per cent and in net earnings of 5.61 per cent, while returns representing 5826 miles of line show an increase in taxes of 9.61 per cent and in operating income of 5.13 per cent.

Of the three groups shown in the accompanying table the Eastern, represented by 4563 miles of line, or about 50 per cent of the total mileage, shows an increase in operating revenue of 7.92 per cent, in operating expenses of 7.68 per cent and in net earnings of 8.27 per cent. Returns representing 3724 miles of line show an increase in the amount of taxes paid of 11.28 per cent and in operating income of 6.84 per cent.

The Southern group, represented by 749 miles of line, had an increase of 5.70 per cent in operating revenues and net earnings, while operating expenses increased 5.69 per cent. Returns for about 65 per cent of this mileage indicate an increase in net income of 8.30 per cent.

The Western group alone shows no improvement. Returns from companies represented by 1817 miles of line

#### REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JULY, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
	Amount	Per Cent Increase	Amount	Per Cent Increase
<b>United States*</b>				
Operating revenues.....	\$17,114,046	5.54	\$15,938,372	5.35
Operating expenses.....	10,187,289	5.49	9,465,371	5.04
Net earnings.....	6,926,757	5.61	6,473,901	5.82
Taxes.....	.....	.....	1,029,340	9.61
Operating income.....	.....	.....	5,443,661	5.13
Operating ratio, per cent:				
1915.....	59.55	...	59.56	...
1916.....	59.52	...	59.38	...
Miles of line represented..	7,129	...	5,826	...
<b>Eastern District*</b>				
Operating revenues.....	\$12,199,886	7.92	\$11,648,387	7.47
Operating expenses.....	7,080,538	7.68	6,780,488	7.47
Net earnings.....	5,119,348	8.27	4,867,899	7.47
Taxes.....	.....	.....	719,052	11.28
Operating income.....	.....	.....	4,148,847	6.84
Operating ratio, per cent:				
1915.....	58.17	...	58.21	...
1916.....	58.03	...	58.20	...
Miles of line represented..	4,563	...	3,724	...
<b>Southern District*</b>				
Operating revenues.....	\$841,815	5.70	\$549,704	5.04
Operating expenses.....	493,437	5.69	307,929	3.53
Net earnings.....	348,378	5.70	241,775	7.03
Taxes.....	.....	.....	43,359	1.61
Operating income.....	.....	.....	198,416	8.30
Operating ratio, per cent:				
1915.....	58.61	...	56.83	...
1916.....	58.62	...	56.01	...
Miles of line represented..	749	...	499	...
<b>Western District*</b>				
Operating revenues.....	\$4,072,345	d1.05	\$3,740,281	d0.69
Operating expenses.....	2,613,314	d0.05	2,376,954	d1.16
Net earnings.....	1,459,031	d3.78	1,363,327	0.14
Taxes.....	.....	.....	266,929	6.65
Operating income.....	.....	.....	1,096,398	d1.33
Operating ratio, per cent:				
1915.....	63.53	...	63.85	...
1916.....	64.17	...	63.55	...
Miles of line represented..	1,817	...	1,603	...

NOTE.—Letter d denotes a decrease.

\*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

show a decrease in operating revenues of 1.05 per cent, almost no change in operating expenses and a decrease in net earnings of 2.78 per cent. Moreover, returns for about 87 per cent of this mileage show an increase in the amount of taxes paid of 6.65 per cent and a decrease in net income of 1.33 per cent.

There was almost no change in the operating ratio of all the districts, the operating ratio of the United States as a whole decreasing from 59.55 per cent in 1915 to 59.52 per cent in 1916.

### ANNUAL REPORT

#### Boston Elevated Railway

The statement of income, profit and loss of the Boston (Mass.) Elevated Railway for the fiscal year ended June 30, 1916, follows:

Railway operating revenues.....	\$18,686,971
Operating expenses:	
Maintenance of way and structures.....	\$1,733,379
Maintenance of equipment.....	1,324,964
Power.....	1,233,259
Conducting transportation.....	5,928,095
Traffic.....	18,901
General and miscellaneous.....	1,841,396
Total.....	\$12,079,996
Net revenue—railway operations.....	\$6,606,975
Taxes assignable to railway operations.....	1,043,041
Operating income.....	\$5,563,934
Non-operating income.....	94,356
Gross income.....	\$5,658,290
Deductions from gross income:	
*Rent for leased roads.....	\$2,580,490
†Miscellaneous rents.....	730,505
Net loss on miscellaneous physical property.....	5,261
Interest on funded debt.....	1,064,624
Interest on unfunded debt.....	65,052
Amortization of discount on funded debt.....	3,755
Miscellaneous debits.....	4,828
Total.....	\$4,454,520
Net income.....	\$1,203,770
Dividends.....	1,193,970
Balance to surplus.....	\$9,800

\*Includes rent of Tremont Street subway. †Rents of all other subways and tunnels.

During the last fiscal year the revenue passengers carried totaled 363,477,041, an increase over the previous year of 17,160,457 or 4.9 per cent. The gross operating revenues increased \$888,364 or 4.9 per cent, while the operating expenses rose \$792,013 or 7.0 per cent. The net revenue from railway operations, therefore, increased only \$96,351 or about 1.5 per cent. Every group in the operating expense division showed increases except power, the expenses for which fell off \$57,058 or 4.4 per cent. The other items increased as follows: Maintenance of way and structures, \$303,812 or 21.2 per cent.; maintenance of equipment, \$121,613 or 10.1 per cent.; conducting transportation, \$307,266 or 5.4 per cent; traffic, \$13,611 or more than 250 per cent, and general and miscellaneous, \$102,767 or 5.9 per cent.

The total charges against the income account for taxes, rent of leased roads, rent of subways and tunnels, interest on funded debt, interest on unfunded debt and miscellaneous items for the last year amounted to \$5,497,562, an increase over the previous year of \$223,214. The items which increased were as follows: Interest on funded debt, \$101,005; rent of leased roads, \$70,515; rent of subways and tunnels, \$89,696, and miscellaneous items, \$9,258. The interest on the unfunded debt was \$21,113 less than for the preceding year. The net income for the last year showed a decrease of \$120,449 or 9.0 per cent. The dividend payments were decreased from 5½ per cent to 5 per cent, and the balance to surplus declined from \$10,852 to \$9,800.

The revenue car miles run during the year totaled 58,572,308, and the revenue car hours 5,515,231. The total surface track on June 30, 1916, was 486.85 miles, and the total rapid transit track 36.85 miles, or together 523.70 miles. The company had on the above-named date 5946 stockholders, owning 238,794 shares. Of these 5271, owning 215,149 shares, were in Massachusetts.



## B. R. T. GROSS INCREASES

According to the report of the Brooklyn (N.Y.) Rapid Transit Company for the quarter ended Sept. 30, 1916, the gross operating revenues showed an increase of \$418,006 or 5.7 per cent over those of the corresponding period in 1915. The operating expenses, however, also increased \$313,430 or 8.1 per cent, so that the net revenue from operation rose only \$104,756 or 3.0 per cent. Taxes jumped materially, to the extent of \$107,848 or 24.9 per cent.; non-operating income showed a slight falling off, and, owing to new rapid transit lines being placed in operation, income deductions rose \$239,475 or 20.6 per cent. The net result of these factors was a decrease in surplus of \$246,573 or 12.4 per cent. The comparative statement for the third quarter in 1915 and 1916 follows:

	1916	1915
Gross operating revenue.....	\$7,719,324	\$7,301,318
Operating expenses .....	4,175,597	3,862,167
Net revenue from operation.....	\$3,543,727	\$3,439,151
Taxes .....	539,779	431,931
Operating income .....	\$3,003,948	\$3,007,220
Non-operating income .....	125,709	129,535
Gross income .....	\$3,129,657	\$3,136,755
Income deductions .....	1,401,837	1,162,362
Surplus .....	\$1,727,820	\$1,974,393

## TAXES ASSESSED IN VIRGINIA

The total value of the tangible and physical property of electric railways in Virginia, as assessed by the State Corporation Commission for the year 1915, was \$8,891,358. The State property tax on this assessed value, the tax on money and the franchise tax amounted to \$65,901. The total State tax assessed against electric railways for 1914 was \$83,225, a decrease of \$17,324 in 1915, caused chiefly by the reduction of the rate from \$0.35 to \$0.10 on \$100 of value. The accompanying table shows the detailed tax figures for the various companies. The tax on money is omitted, the total for all companies being only \$1,255.

The total value of the tangible and physical properties of the canals and steam railroads in the State for 1915 was \$127,840,979, the total taxes thereon amounting to \$1,430,827, an increase of \$346,608 over 1914. The value of the property of light, heat, power, gas and water companies operating in the State was fixed at \$10,481,241, while the taxes thereon totaled \$37,608, a decrease of \$22,628 from 1914 owing to the reduction in the rate from 1 per cent to one-half of 1 per cent.

1915 Taxable Values of Virginia Electric Railways with Taxes Assessed Thereon, and the Franchise Tax Assessed on the Gross Transportation Receipts for Year Ended June 30, 1915.

Name of Company	Miles	Total Property Value	Tax on Property	Franchise Tax	Total Tax
Appalachian Pr. Co..	1.05	\$11,856	12	134	146
Blue Ridge Lt. & Pr. Co.	5.30	35,937	36	165	202
Bristol Trac. Co....	3.57	13,983	14	79	93
Charlottesville & Albemarle Ry. ....	3.53	125,985	126	474	600
Danville Tr. & Pr. Co.	6.35	167,420	167	1,479	1,635
Henrico & Chesterfield Ry. ....	2.50	3,750	3		3
Lynchburg Tr. & Lt. Co.	14.74	455,635	455	2,677	3,132
Mill Mountain Incline Co. ....	0.37	13,950	14	45	60
Newport News & Hampton Ry., Gas & Elec. Co. ....	32.54	901,940	902	3,718	4,806
Norfolk City & Suburban Ry. ....	4.50	27,322	27	76	104
Norfolk & Ocean View Ry. ....	8.88	111,729	112	694	806
Norfolk Ry. & Lt. Co.	32.39	685,310	685		685
Radford Wtr. & Pr. Co.	2.63	16,922	17	102	120
Richmond & Chesapeake Bay Ry. ....	14.72	304,085	305	624	941
Richmond & Henrico Ry. ....				594	594
Richmond Ry. & Viaduct Co. ....	4.93	406,060	406	710	1,116
Richmond & Rappahannock River Ry.	25.44	158,031	158	573	731
Roanoke Ry. & Elec. Co. ....	24.57	515,352	515	3,567	4,082
Tazewell St. Ry. ....	1.97	7,410	7	103	116
Virginia Ry. & Pr. Co.	137.04	3,401,111	3,401	30,964	35,316
Washington & Old Dominion Ry. ....	69.99	932,977	933	4,769	5,702
Washington Utilities Co. ....					10
Washington-Virginia Ry. ....	38.39	593,808	594	4,201	4,841
<b>Total .....</b>	<b>435.41</b>	<b>\$8,891,358</b>	<b>\$8,891</b>	<b>\$55,754</b>	<b>\$65,901</b>

## ANOTHER OHIO DEAL REPORTED

Reports from Cleveland printed in the daily papers say that a holding company is in formation to take over stocks of Cleveland, Southwestern & Columbus Railway, Lake Shore Electric Railway, Lorain Street Railway, Sandusky, Fremont & Southern Railway, Cleveland, Painesville & Eastern Railway, and Cleveland, Painesville & Ashtabula Railroad. The Cleveland, Southwestern & Columbus Railway is controlled by Mandelbaum interests of Cleveland, while the other lines are controlled by E. W. Moore and H. A. Everett. The lines in the proposed new consolidation operate 400 miles from Toledo to Ashtabula and south from Cleveland to Wooster and Bucyrus, with through service to Columbus by traffic arrangements with lines south from Bucyrus.

The resident correspondent of the ELECTRIC RAILWAY JOURNAL in Cleveland reported on Oct. 25 that officials of the Lake Shore Electric Railway, the Cleveland, Painesville & Eastern Railway and the Cleveland, Southwestern & Columbus Railway stated they know nothing of negotiations of Eastern capitalists for the control of these properties. One of the men interviewed stated distinctly that up to that time there had been no negotiations so far as he was aware.

## BEST YEAR FOR CALIFORNIA UTILITIES

What is called the "banner year" for public utility business in California is described in advance sheets of the annual report of the State Railroad Commission. The total operating revenue of California public utilities, including the entire business of the interstate railroads, which has not been segregated by them, was \$384,617,734 for the year ended June 30, 1916. The operating expenses were \$249,303,932, leaving net operating revenue for the year of \$135,313,802. These figures do not reflect the very great increase in the earnings of the steam railroads during the fiscal year, for which the data are not yet completely available. Under regulation by the commission and notwithstanding general financial depression, the net operating revenues of California utilities were \$2,879,708 greater in 1915 than in 1913 and \$5,710,327 greater in 1915 than in 1914.

During the years 1913, 1914 and 1915, additions, betterments and new construction were made by the principal classes of California utilities as follows: Steam railroads, \$55,048,385; electric railroads, \$15,603,661; electric companies, \$56,381,721; gas companies, \$10,099,696; telephone companies, \$46,374,853; water companies, \$6,999,708; total, \$190,508,527. Much more than \$200,000,000 in cash has gone into the further development of California public utilities during the period of supervision and regulation by the commission.

**Electric Bond & Share Company, New York, N. Y.**—The Electric Bond & Share Company has declared an extra dividend of \$1,000,000 on its common stock, all of which will go to the General Electric Company, as owners of the \$6,000,000 of common stock outstanding. The directors have also authorized the issue of \$2,000,000 additional preferred stock and a like amount of new common. The preferred will be offered at par and accrued dividends to holders of preferred stock of record at the close of business on Oct. 31, in the proportion of one share of new stock for each three shares held. The entire issue has been underwritten by William P. Bonbright & Company. The new common stock will be subscribed and paid for upon delivery to the General Electric Company. With the increases in effect, the company will have outstanding \$8,000,000 of each class of stock.

**Evanston (Ill.) Railway.**—The Illinois Public Utility Commission has authorized the Evanston Railway to make a mortgage in favor of the Merchants' Loan & Trust Company, Chicago, Ill., as trustee to secure an issue of \$44,800 of first and general mortgage bonds.

**Interborough Rapid Transit Company, New York, N. Y.**—The Interborough Rapid Transit Company has sold \$12,229,000 of 5 per cent first and refunding mortgage bonds to a syndicate headed by Lee, Higginson & Com-



pany, Harris, Forbes & Company and Kissel, Kinnicutt & Company. The bankers have also taken an option on another block of the same size. The bonds will be offered at 98%. The same bankers headed other selling syndicates for this issue of Interborough Rapid Transit Company bonds, the proceeds of which go to the construction of the new subways. The Public Service Commission authorized a total amount of \$106,957,000 of the bonds, of which only \$12,229,000 will remain to be disposed of when the latest transactions are completed. The bonds are callable at 110 and interest on any interest date, in any amount for the sinking fund, or at the option of the company either as a whole or in blocks of not less than \$500,000.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—John Skain and George K. Graves, both of Lexington, were added to the directorate of the Kentucky Traction & Terminal Company at the annual meeting recently held in that city. The other directors were re-elected.

**Ottumwa Railway & Light Company, Ottumwa, Iowa.**—Fox, Hoyt & Company, Milwaukee, Wis., are offering at 97½ and interest, to yield 5.40 per cent, a block of first and refunding mortgage 5 per cent gold bonds of the Ottumwa Railway & Light Company dated Jan. 1, 1906, and due Jan. 1, 1924. These bonds are part of an issue limited to \$1,500,000, of which \$1,063,000 is outstanding, \$73,000 has been retired through sinking fund and \$86,000 is held in escrow for improvements.

**Public Service Corporation of New Jersey, Newark, N. J.**—A gross increase of \$423,477 in total business for September, 1916, over September, 1915, an increase of 13.2 per cent, is shown by the financial statement just issued by the Public Service Corporation of New Jersey for September last. For the nine months ended Sept. 30, 1916, the gross increase in total business over the corresponding period in 1915 was \$3,630,253, representing an increase of 13.3 per cent. For the month of September, 1916, the balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, was \$562,707, and the increase in surplus available for dividends over the corresponding month of 1915 was \$98,439. For the nine months ended Sept. 30, 1916, the balance available for amortization, dividends and surplus totaled \$3,927,314, while the increase in surplus available for dividends amounted to \$888,504.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—The Missouri Public Service Commission has signed the order permitting the St. Joseph Railway, Light, Heat & Power Company to create a new mortgage to secure first and refunding mortgage sinking fund 5 per cent thirty-year gold bonds, due 1946. The company was authorized to issue \$751,000 of the bonds immediately, \$326,000 being utilized to retire the bonds outstanding on its interurban railway property. The new bonds are secured by a first mortgage upon the electric railway running between St. Joseph and Savannah, and by a second mortgage upon the remainder of the property of the company, including the street railway system and electric light and power plant and a central heating station serving St. Joseph.

**Syracuse & South Bay Electric Railroad, Syracuse, N. Y.**—Plans have been perfected for the reorganization of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad. The plans provide that the present holders of first mortgage bonds of the Syracuse & South Bay road will receive a \$300 5 per cent mortgage bond and \$600 in new first preferred stock for each \$1000 bond held. In the Syracuse, Watertown & St. Lawrence River road arrangements present first mortgage bondholders will receive a \$200 5 per cent mortgage bond and \$475 of first preferred stock for each \$1000 held. Holders of other securities will receive an equal amount of second preferred stock for those held. Holders of present first preferred stock of the South Bay line will receive new common stock equal in value to 50 per cent of their old stock. Through this procedure the common stock of both roads will be eliminated. The present bond issue will be reduced from \$375,000 to \$205,000. In order to meet the current expenses and the cost of the receivership a \$50,000 first lien note issue is proposed.

## DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1% per cent, preferred.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ontario, quarterly, 1 per cent, ordinary.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred; monthly, one-half of 1 per cent, common.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred B; quarterly, 1¼ per cent, common.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, common and preferred.

Lehigh Valley Transit Company, Allentown, Pa., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

## ELECTRIC RAILWAY MONTHLY EARNINGS

		BATON ROUGE (LA.) ELECTRIC COMPANY				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$17,352	\$8,528	\$8,824	\$3,528	\$5,296
1 " " '15		15,284	8,715	6,569	2,169	4,400
12 " " '16		207,284	104,233	103,051	37,623	65,428
12 " " '15		183,355	109,968	73,387	25,420	49,967

		BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$15,933	\$10,446	\$5,487	\$1,105	\$4,382
1 " " '15		14,394	9,070	5,324	1,107	4,217
12 " " '16		120,329	103,765	16,564	13,241	3,322
12 " " '15		116,775	99,084	17,691	13,602	4,089

		COLUMBUS (GA.) ELECTRIC COMPANY				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$74,427	\$29,465	\$44,962	\$28,654	\$16,308
1 " " '15		55,999	25,760	30,239	28,679	1,560
12 " " '16		814,064	339,132	474,932	344,091	130,841
12 " " '15		701,435	321,247	380,188	345,000	35,188

		DALLAS (TEX.) ELECTRIC COMPANY				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$149,870	\$96,559	\$53,311	\$36,587	\$16,724
1 " " '15		147,944	92,059	55,885	33,398	22,487
12 " " '16		1,903,196	1,181,133	722,063	430,362	291,701
12 " " '15		1,906,442	1,114,880	791,562	400,741	390,821

		EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$71,088	\$39,148	\$31,940	\$9,059	\$22,881
1 " " '15		55,065	29,325	25,740	8,930	16,810
12 " " '16		813,903	428,527	385,375	106,249	279,126
12 " " '15		670,497	378,939	291,558	104,831	186,727

		FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$203,228	\$129,261	\$73,967	\$48,296	\$25,671
1 " " '15		179,548	120,996	58,552	43,550	15,002
8 " " '16		1,657,124	1,116,855	540,269	389,228	151,041
8 " " '15		1,533,164	1,016,899	516,265	394,811	121,454

		GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$168,724	\$104,365	\$64,359	\$36,429	\$27,930
1 " " '15		135,756	89,610	46,146	35,915	10,231
12 " " '16		1,935,343	1,215,651	719,692	437,338	282,354
12 " " '15		2,039,965	1,216,817	823,148	432,926	390,222

		HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$29,459	\$16,327	\$13,132	\$5,241	\$7,891
1 " " '15		25,511	12,903	12,608	5,522	7,086
12 " " '16		313,999	175,833	138,166	65,042	73,124
12 " " '15		264,104	163,413	100,691	66,888	33,803

		JACKSONVILLE (FLA.) TRACTION COMPANY				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$49,422	\$34,769	\$14,653	\$15,408	†\$755
1 " " '15		47,613	35,436	12,177	14,601	†2,424
12 " " '16		617,874	419,744	198,130	180,890	17,240
12 " " '15		629,754	441,863	187,891	170,292	17,599

		NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$155,378	\$97,617	\$57,761	\$28,916	\$28,845
1 " " '15		147,065	89,337	57,728	27,631	30,097
12 " " '16		1,844,384	1,131,646	712,738	341,845	370,893
12 " " '15		1,755,262	1,039,550	715,712	327,835	387,877

		PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$671,861	\$421,667	\$250,194	\$184,963	\$65,231
1 " " '15		606,229	387,167	219,063	182,894	36,169
12 " " '16		7,775,272	4,988,526	2,786,746	2,204,547	582,199
12 " " '15		7,763,789	4,787,515	2,976,274	2,160,424	815,850

		SAVANNAH (GA.) ELECTRIC COMPANY				
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '16		\$69,891	\$47,833	\$22,058	\$23,713	†\$1,655
1 " " '15		65,767	44,786	20,981	23,274	†2,293
12 " " '16		795,821	535,472	260,349	280,513	†20,164
12 " " '15		801,161	520,838	280,323	278,030	2,293

\*Includes taxes. †Deficit. ‡Includes non-operating income.



## Traffic and Transportation

### FARE INCREASE IN MASSACHUSETTS

**Six-cent Rate Approved for Major Portion of Massachusetts  
Northeastern Street Railway by Commission—  
Honest Capitalization and Efficient Man-  
agement Accredited to Road**

On Oct. 14 the Massachusetts Public Service Commission approved the general establishment of a 6-cent fare unit by the Massachusetts Northeastern Street Railway, with exceptions in certain city districts traversed by the company's lines in competition with the Bay State Street Railway and in other urban centers where the sale of tickets at five for 25 cents is required by the board. The company operates 128.31 miles of single track, of which 82.44 miles are in Massachusetts and 45.87 miles in New Hampshire. The road was originally called the Haverhill & Southern New Hampshire Street Railway, and was used as the medium under which ten other street railways under common control and management were merged into one in 1913. All the common stock of the Massachusetts Northeastern Street Railway is held by the New Hampshire Electric Railways.

The outstanding capitalization on June 30, 1916, including short-term notes, was \$3,576,000. The total permanent investment was carried on the company's balance sheet at \$3,573,917, or about \$30,000 per mile of single track. The commission held that the present capitalization of the company in stock and bonds represents capital honestly and prudently invested in property, which (allowing for replacements) still exists. The capitalization per mile was found to be moderate.

The company has never been a paying property. With the exception of two lines, none of the companies included in the 1913 merger ever paid a dividend. The physical condition of both these roads was poor, and more than \$300,000 has been expended in their rehabilitation in recent years. Since the 1913 merger, the Massachusetts Northeastern Street Railway has paid no dividends whatever upon its common stock. In 1914 a 3 per cent dividend was declared upon the preferred stock, but no other payments have been made. The surplus over fixed charges in the last fiscal year amounted to less than 6 per cent upon the preferred stock, eliminating the common stock, and it was even less in the two previous years. Only \$3,329 was set aside for depreciation in 1916, or one-half of 1 per cent on the cost of the equipment.

The commission found the property to be well managed, with every effort being made properly to allocate general expenses between the various utilities affiliated with the road, which include properties in New Hampshire and Maine. The railway pays 1.4 cents per kilowatt-hour, and operates and maintains its substations, assuming all transforming losses. Including the latter, the price of power for 1915 was about 1.75 cents per kilowatt-hour. The commission looked upon this cost as relatively high, although it recognized that interest and depreciation charges on a generating station and transmission lines were saved. The resulting cost per car-mile is high on the Massachusetts Northeastern Street Railway, being 6.19 cents in 1915 and 6.36 cents in 1916. The commission, however, was unable to say that the company could secure its power upon more advantageous terms in any other way. The character of the system and of its business is not favorable to low-cost power, the summer peak loads at week-ends and holidays being far beyond the normal peaks throughout the year.

The cars are operated with a reasonable measure of efficiency. The schedule speed in 1914 was 11.55 m.p.h., only two other large systems in the state providing faster service. In recent years the running time has been reduced upon several routes. The cars are in general in good repair and well painted. While much of the equipment is of a type that would hardly be selected at present, few of the

cars are fifteen or more years of age, and the management has recently ordered a number of more modern semi-convertible cars. The trucks are in general of a standard type. Barns, shops and storerooms appear to be in good condition and well handled. Salaries are moderate, and general and miscellaneous expenses comparatively low. In 1915 these expenses amounted to 9.73 per cent of operating revenue, compared with an average of 10.73 per cent for all the railways of the State.

Maintenance expenditures for the last ten years amounted to 20.71 per cent of operating revenue. The commission commended the management for sacrificing dividends in favor of a liberal maintenance policy. It pointed out that there are important items which will be subject to replacement later, viz.: cars, rails, buildings and power apparatus. The company has set aside no fund for the renewal of these items, barring the wholly inadequate provision for rolling stock depreciation which it has set aside in the last two years. Such a provision should be made and the public should meet its requirements. In general, it was held that the company is not earning a reasonable return upon the capital honestly and prudently invested in its system.

On the assumption that the new rates would yield 15 per cent additional revenue, the total increase in earnings would amount to about \$115,000 on the 1916 traffic basis. In view of the experience with similar increases in fares upon other Massachusetts street railways, this estimate is probably high. If additional revenue of that amount had been secured in 1916, the net income would have been sufficient for the payment of dividends of 6 per cent upon the common and preferred stock, leaving about \$25,000 for depreciation and the retirement of floating debt, an amount said to be certainly not excessive and probably inadequate. Moreover, a company which has for so long a time gone without dividend payments, and has, by this sacrifice, maintained its property in good operating condition, has an excellent claim to a return upon its common stock materially higher than 6 per cent.

The zones on the Massachusetts Northeastern are comparatively long. Excluding the beach sections, where only summer service is given, the average length of the fare sections on all divisions is 4.04 miles, which, on the basis of a 6-cent fare, is at the rate of 1.48 cents per mile. The length of the present zones radiating from Haverhill and Lawrence ranges from 3.75 to 5.94 miles. In view of the length of these zones and the character of the system as a whole, the commission did not feel that the company can fairly be required to retain the 5-cent fare throughout the entire distance, in each instance, except so far as the necessity of meeting the competition of the shorter Bay State line between Haverhill and Lawrence makes it to its own business interest to do so. The commission was of the opinion that the company, by the sale of five tickets for 25 cents, should maintain a 5-cent rate upon such portions of the zones in question as are within a distance of about 3.5 miles from the centers of the respective cities, local conditions to determine the exact distance. With the establishment of the 6-cent fare, school tickets will be sold at 3 cents instead of 2.5 cents each and all other existing reduced-fare tickets will be advanced 20 per cent in price. The case may be reopened after a year.

### STANDARDS OF SERVICE ADOPTED FOR WASHINGTON

The Public Utilities Commission of the District of Columbia has adopted the regulations regarding standards of electric railway service in the district effective on Nov. 1. These standards are substantially the same as the tentative ones reviewed in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2, page 419.

In its review of the matter the commission says that having in mind the possible adoption of standards of service studies were made of the application of the principles involved to the service and a public hearing was held on Oct. 26, 1914. After additional studies a second public hearing was held on June 19, 1916. Further studies were then made and conferences were held with representatives of the electric railways. A complete draft of the order was



finally made and furnished to all those interested. Another hearing was held on Sept. 6, 1916.

The commission says that in determining what standards should be applied it has refrained from changing materially the service which is being furnished on the average by the electric railways in the district. It says that a close relation naturally exists between the service and the price paid for the service. In this connection it calls attention to the valuation now being made of the electric railways in the district, and says that when the valuation has been completed "the commission will be in a position to determine what is fair and adequate service and what are fair and reasonable rates therefor."

At the hearings the Washington Railway & Electric Company took the position that there is no authority in the Public Utilities Act for adopting any measurement or standard of electric railway service; that the establishment of such a standard involves the question of rate of fare; that there are no complaints of the existing service; that standards would interfere with interstate traffic; and that the commission has no authority to require the electric railways to make observations of traffic or to require the procedure outlined in connection with the commission's non-compliance notice. In this connection the commission says that changes have been made in the original draft relative to making observations of traffic in order to remove "legally technical objections." It expresses the belief that with these changes made the objections of the company to the regulations are without foundation.

The Capital Traction Company suggested that the commission go no farther than the establishment of a rush standard at present, and that this standard receive a trial for a definite period of time before adoption. It argued that the order should exempt traffic covering periods of unusual demand such as baseball games, the inaugural exercises, etc.

The commission expresses the opinion that there is no danger to the electric railways from the formal adoption of the standards, and says that it was found that the regulations standardize rather than increase the service now being furnished. It says that to include in the regulations a general clause exempting from the operation of the standards the special classes of traffic referred to would practically nullify the effect of the whole order.

On Oct. 7 the Washington Railway & Electric Company filed with the Public Utilities Commission a letter asking reconsideration of the order recently adopted by the commission establishing standards for service in the district. Seven specific objections are filed by the company. The two most prominent are that the order involves a rate question and that the commission heretofore has refused to consider rate questions pending completion of the valuation, and that the company is engaged largely in interstate business, which would make compliance with the order difficult, since it applies only to the district.

#### RIGHT OF CITY TO REGULATE JITNEYS SUSTAINED

The contention of the city of Dallas, Tex., that jitneys operating on the streets of Dallas are subject to police regulation, is upheld in the decision of the State Supreme Court in the case styled *C. C. Booth et al. vs. the city of Dallas*, injunction, known as the "Dallas Jitney Case," which had gone to the State Supreme Court on application for writ of error. The highest state court refused the application for a writ of error, thereby sustaining the decision of the lower court in which the right of the city to regulate jitneys was acknowledged.

In the trial court, in which the Jitney Drivers' Union of Dallas sought to secure an injunction restraining the city of Dallas from interfering with the free and untrammelled operation of jitney buses over the streets of the city, three district judges sitting en banc refused the injunction. The case was appealed to the Court of Civil Appeals where the decision of the district court was upheld. The case was then carried to the Supreme Court on application for a writ of error and the decision of the district court was again upheld.

The Dallas jitney case is one of two cases involving the right of a city to regulate jitneys to reach the Supreme Court, and in each case the decision of the court has been favorable to the cities seeking to regulate jitney traffic.

#### EIGHT-CENT FARE UNIT AUTHORIZED

##### Decision of New Hampshire Commission in Manchester & Derry Street Railway Case Makes Company Just Self-Supporting

The establishment of an 8-cent fare unit in place of the existing 5-cent unit on the Manchester & Derry Street Railway was recently authorized by the New Hampshire Public Service Commission. The cars, in operating from Derry to Manchester, run over the company's own lines, a distance of 8.03 miles to the tracks of the Manchester & Nashua Street Railway, thence to Goffs Falls, and over the tracks of the Manchester Street Railway to Manchester, a distance of 4.451 miles. The fare has hitherto been 5 cents for each zone, viz., Manchester to Goffs Falls, Goffs Falls to Londonderry and Londonderry to Derry. The company desired to increase the two fares on the Derry road to 8 cents each. The former fare from any point in Manchester to Londonderry was 10 cents, and the fare to Derry 15 cents from Manchester. These it was proposed to increase to 13 and 21 cents, respectively.

The road began operation about eight years ago. Its capital stock is \$175,000; bonded indebtedness, \$125,000, and notes, \$51,000. The notes were in part used to meet the deficit from operations, which in the eight years amounted to \$43,008. The condition of the company does not seem to be improving, as the deficit for the nine months ended March 31, 1916, was \$6,001, without any depreciation allowance. At least \$300,000 was expended on the property. The cost was not abnormal, the decision stated, and there is no evidence or indication of any bad judgment or extravagance in construction, except as it may have been an error of judgment to build the road at all. The commission held that those who had invested their money in good faith in a public service enterprise where the demand for the service was insufficient at any reasonable price to yield a normal return upon the investment could not expect such a return, but the investors ought not to be compelled to continue to render the service at a loss. On the face of the figures the company was paying for the privilege of serving the public.

A careful scrutiny of the company's operating expense failed to disclose any item in which substantial reduction could be effected. On the other hand, it appeared that operating expenses should be increased by larger expenditures for maintenance, and the failure to maintain a depreciation reserve made more pressing the need for such a reserve in the future. Up to the present the company had been free from taxation, but beginning with 1918 it would inevitably have to meet a substantial annual charge for taxes. The company obviously needed more money, the decision stated, and it could be obtained only through increase of rates.

The proposed schedule, based on the traffic for the fiscal year 1916, would produce increased revenue of \$17,050, assuming that no diminution in patronage followed the increase in rates. Such an assumption, however, was said to be unsafe. To take care of the annual deficit and necessary increased provision for maintenance would require more than \$8,000. An annual depreciation reserve of about \$5,000 could not be deemed excessive. This would leave \$4,000 to \$5,000 to be applied in reduction of the accrued deficit until such time as the property would come in for taxation, when the whole balance, if not more, would probably be required for that purpose. The proposed rate, therefore, might make the company self-supporting, but it could hardly do more. It offers no substantial hope of any return whatever on the investment in the near future, if at all.

In such a situation, the commission held, it does not see how it could justify a refusal of the rate increase. The road is in active competition with the Boston & Maine Railroad, and its fares cannot be judged by the standard of an urban street railway having a monopoly. It occupies, in this respect, a position intermediate between the street railway and the steam railroad. The proposed fare of 16 cents, computed on the total length of its line, amounts to 1.99 cents per mile. Including the fare of 5 cents on the Manchester city road, the total proposed fare from Manchester to Derry becomes 21 cents. On the Boston & Maine Railroad the fare is 28 cents from Manchester to



Derry, or by mileage, 27 cents. The commission said that the rates on an interurban road must be expected to be lower than by steam railroad, because the service, though more frequent, is notably inferior in speed, and that they must also be expected to be higher than on a purely urban street railway, on account of the lower density of traffic and longer ride. The only question is whether the relative proportion which the proposed rates bear to normal street railway rates on the one hand and to railroad rates on the other is so manifestly irrational that they cannot be permitted, regardless of the company's financial condition. No such disproportion in the present case could be found. The commission therefore authorized the 8-cent rate to go into effect on Oct. 1.

**Safety-First Exhibit in Louisville.**—In connection with a safety-first exhibit which the Boy Scouts organization at Louisville, Ky., is planning, the Louisville Railway and the Louisville & Southern Indiana Traction Company have loaned to the Scouts placards which the companies are using in their cars. These will be displayed in groups and the scout master in charge will explain the purposes of the placards to those who stop at his booth.

**Tulsa Jitneys Under Restraint.**—Jitney buses in Tulsa, Okla., were forced out of business by a city ordinance that went into effect on Oct. 19. This ordinance requires heavy indemnity bonds from the jitneys and regulates the routes, forcing them to streets on which the street railway has no tracks. Considerable inconvenience was experienced for several days, as the Tulsa Traction Company was not fully prepared to handle the additional traffic that was suddenly thrown on it. This situation was quickly adjusted.

**Near Side Stops in Portland, Ore.**—On Oct. 1, cars of the Portland Railway, Light & Power Company, Portland, Ore., began stopping on the near side of street intersections on paved streets, instead of on the far side, as in the past. The change is included in the new city traffic ordinance and will be applied by the street railway company, in spite of the fact that enforcement of the traffic ordinance has been suspended by the city temporarily. The street cars carried placards announcing the new method, and carmen were instructed to use discretion in assisting the public to become accustomed to the change.

**Fall Service Advertised Again at Louisville.**—The Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company are consistently using printers' ink in encouraging travel. At this time of the year the advertisements extoll the beauties of the autumn foliage on Silver Hills and along Silver Creek, near New Albany, Ind. It is suggested day after day that patrons of the company can ride over from Louisville, go to the woods and gather the bright-hued leaves. The advertisements are inserted on the amusement advertising scale, which entitles the advertiser to reading notices elsewhere.

**Parlor-Café Cars for Texas Road.**—The Texas Electric Railway, Dallas, Tex., will inaugurate interurban parlor-café cars about Jan. 1, 1917, on its lines between Denison and Corsicana and Waco. Announcement to this effect has been made by Burr Martin, general manager of the Southern Traction Company and the Texas Traction Company. The parlor-café cars will be attached as trailers to the regular interurban trains as now operated. Six new passenger cars, acquired by the Strickland interests when they purchased the Dallas-Waxahachie interurban from Stone & Webster in 1912, will be converted into parlor-café cars, the work being done in the Strickland shops at Monroe, south of Oak Cliff.

**Advertising Campaign Against Jitneys.**—The Dallas (Tex.) street railways are seizing on opportune themes for their advertisements in their campaign for business against the jitneys. An advertisement that appeared in the daily newspapers during the Texas State Fair at Dallas, Oct. 14-29, addressed to "Fair Visitors," said "Why take chances of being robbed or assaulted by thugs or bandits. Ride the street cars. The safe way. Dallas Electric Railways, E. T. Moore, manager." The appeal in this ad was based on the fact that there had been numerous robberies and holdups by persons pretending to operate jitneys. Getting their intended victims in their car, they would drive to some lonely place and there assault and rob them.

**Change in Traffic Regulations at Toledo, Ohio.**—A special committee of the City Council at Toledo, Ohio, submitted a report to the committee on railways and telegraphs on Oct. 18 which, it is believed, will result in an improvement in the street railway service. At several of the stops in the busiest districts provision is made for loading two cars at a time, and it is recommended that chains be placed about the safety strip, so that vehicular traffic may be continuous. At other points it is recommended that the cars cross the street before loading and unloading, that two cars be loaded at the same time and that chains be placed about the safety strips. At a few other points the committee advises that vehicles be stopped when street cars are in the process of loading or unloading.

**San Francisco Considers Bus Line Auxiliary Service.**—In a recent report to the Board of Supervisors, M. M. O'Shaughnessy, city engineer of San Francisco, Cal., suggested that further study be made of the feasibility of putting in operation an auto bus line to extend the service of the Municipal Railway System into the Hunters Point district. The bus line route would be from the present terminal of the Potrero Avenue branch, which is about 3 miles distant from the industrial center at Hunters Point. The idea is not that the line would be profitable at first, but that if it is decided to meet the service needs of this district, the service could be supplied at least cost by auto buses. A branch of the municipal line could be built later if sufficient traffic developed to warrant the construction of the line.

**Through Service Connection Ordered at Boston.**—The Public Service Commission of Massachusetts has issued an order requiring the Boston Elevated Railway and the Bay State Street Railway to install a track connection in Arlington, to provide for the operation of through cars between Winchester and Harvard Square, Cambridge. The Bay State Street Railway operates cars at present from Winchester to Arlington Center and the remainder of the trip to Harvard Square is made in cars of the Boston Elevated Railway. It is urged that the installation of through service will shorten the running time between Boston and Winchester and give residents of the latter municipality the advantages of a through connection with Cambridge subway trains, which will shortly be operated through Summer Street, Boston, to the South Station.

**Another New Jersey Line Seeks to Increase Its Fare.**—The Bucks County Interurban Railway, Trenton, N. J., has applied to the Public Utility Commission of New Jersey and the Public Service Commission of Pennsylvania for permission to put into effect a new schedule of rates, providing for several increases in fares. The company desires the new schedule to become effective on Nov. 26. The proposed schedule provides for an advance of 5 cents in the fare between Trenton and Lambertville, bringing the total fare up to 30 cents. It also provides for an increase from 15 cents to 20 cents in the fare from Trenton to Newtown, Pa., and a 5-cent increase in the fare from Newtown to Bristol, Pa., and from Newtown to Doylestown. No advance is proposed in the fare between Trenton and Morrisville, Pa., between Trenton and Yardley, or between Yardley and Newtown.

**Injunction Obtained in Rochester Fare Case.**—The New York State Railways, operating the Rochester city lines, has obtained an injunction in the Supreme Court of Monroe County against the enforcement of certain sections of the amended Rochester city charter regulating and reducing rates of fare charged by the company. The company was recently ordered to reduce its fare from Rochester to Charlotte territory from 10 cents to 5 cents, but pending the final outcome of the court action a 10-cent fare is being charged. Passengers who pay the extra 5 cents receive a claim coupon which will be redeemed for cash at the company's offices if the rate reduction is sustained. The company maintains that the 5-cent fare zone ends at the city line and therefore has been charging an extra 5 cents between the Rochester city line and Charlotte, a distance of almost 4 miles. Charlotte is on the shore of Lake Ontario and there is heavy travel between the city of Rochester and Charlotte.



## Personal Mention

A. W. Baker has assumed the position of new business manager for the Athens Railway Electric Company, Athens, Ga., to succeed W. P. Strobhar, resigned, who has gone to Ohio.

Maj. J. L. Schley, formerly executive officer of the Public Utilities Commission of the District of Columbia, having been detailed to the United States Engineer Office at New Orleans, La., the commission has appointed Walter C. Allen, formerly electrical engineer of the District of Columbia, as its executive secretary.

Alfred Craven, at present chief engineer of the Public Service Commission for the First District of New York, has been appointed consulting engineer of the commission, effective on Nov. 1. The position was created for the purpose and in recognition of Mr. Craven's valuable services to the city and to the commission. At the same time the commission designated Daniel L. Turner, who is now deputy engineer of subway construction, as acting chief engineer. Mr. Craven was appointed chief engineer of the commission on Oct. 1, 1911.

D. J. McGrath, for the last two years research assistant in the electrical engineering department of the Massachusetts Institute of Technology, has severed his connection with the Institute and joined the staff of the Boston (Mass.) Elevated Railway. Mr. McGrath has been made a special assistant to M. C. Brush, president of the company, in connection with the revenue inquiry now being conducted into the company's affairs by the legislative recess commission established for that purpose. Mr. McGrath is the author of a number of notable articles on electric railway economics, with special reference to fare problems, and before leaving the Institute was occupied with the preparation of a report summarizing the investigations of the department upon electric railway costs and revenues in the past two or three years. At the mid-year meeting of the American Electric Railway Association on Feb. 4, 1916, Mr. McGrath presented a notable paper dealing with the return on Massachusetts investments.

### OBITUARY

William Ward Hinch, Chicago manager of the Albert & J. M. Anderson Manufacturing Company, and Mrs. Hinch, while driving from Chicago to the Jovian convention at Indianapolis, met with an accident near Shelby, Ind., on Oct. 18, in which their automobile was overturned, causing the death of both.

Harry H. Gribben, superintendent of the Oakland, Cal., factory of the Standard Underground Cable Company, died suddenly on Sept. 25 at his home in Oakland, aged fifty-six years. Mr. Gribben was a native of Pittsburgh, Pa., and lived there until 1899, when he moved to California to take charge of the factory which the Standard company had just then completed. Previous to this he was general foreman in the company's Pittsburgh factory. He had been in the employ of the company more than thirty years.

Fenwick E. Low died suddenly at Milwaukee recently at the age of forty-two. He was formerly superintendent of the St. Paul lines of the Twin City Rapid Transit Company and later division superintendent of the Chicago & Milwaukee Electric Railroad, now the Chicago, North Shore & Milwaukee Railroad. Mr. Low became associated with the Twin City Rapid Transit Company subsequent to his connection with the Pullman Car Company, as general agent at Minneapolis. He was chief clerk to the general manager of the Twin City company for a year before being assigned to the management of the St. Paul lines. He was very active during the building of the Selby tunnel in St. Paul in 1907, thereby endangering his health to the extent that early in 1908 he decided to retire from the company. After six months' rest he returned to railway work as manager of the Chatham, Essex & Lake Shore Railway in Canada. Later he entered the employ of the Chicago & Milwaukee Electric Railroad.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

### FRANCHISES

**Berwyn, Ill.**—The Metropolitan West Side Elevated Railway has accepted the ordinance granting franchise rights in Berwyn.

**Blue Island, Ill.**—The Chicago & Interurban Traction Company has accepted a new ordinance recently passed by the City Council of Blue Island extending its rights in that city for a period of twenty years from the date of the passage of the ordinance.

**Litchfield, Ill.**—The Illinois Traction System has received permission from the City Council of Litchfield to reroute the tracks leading into the city from Mount Olive. The change will take the tracks over State Street from the city limits to Water Street, thus eliminating several sharp curves and a dangerous railroad crossing.

**Springfield, Ill.**—The Springfield Consolidated Railway has received a franchise from the Council of Springfield for the construction of a single-track line from the end of its line in East Capitol Avenue to Bergen Park.

**Moundville, W. Va.**—The Wheeling Traction Company has applied to the City Council for a change in its franchise in Moundville and proposes to construct an extension of its tracks.

### TRACK AND ROADWAY

**Mobile, Volanta & Pensacola Railroad, Volanta, Ala.**—This company reports that it expects to place contracts during the next four weeks for 20 miles of rails. The company plans to build 40 miles of new track.

**British Columbia Electric Railway Company, Ltd., Vancouver, B. C.**—It is reported that the City Council of Vancouver will request the British Columbia Electric Railway to continue double-tracking its lines on Hastings Street from Renfrew Street to Boundary Road.

**Sacramento Valley Electric Railroad, Dixon, Cal.**—This company plans to construct an extension from Dixon to Woodland.

**Tampa & Eastern Traction Company, Tampa, Fla.**—Construction has been begun near Gary on this company's proposed line from Tampa to Lakeland, about 33 miles. F. W. Cole, Tampa, president. [July 1, '16.]

**Chicago & Interurban Traction Company, Chicago, Ill.**—In accordance with the new franchise accepted by the Chicago & Interurban Traction Company in Blue Island, reconstruction of the company's double-track lines will be carried out under a three-year program, with 91-lb. 7-in. T-rail on wooden ties set in concrete, with furnace-slag or crushed-stone foundation and granite-block paving. The tracks in Burr Oak Avenue and Western Avenue are to be reconstructed during the first year, the Calumet Grove line the second year and the Vincennes Avenue tracks the third year. The company will furnish on all of its poles on Western Avenue and on certain poles on Burr Oak Avenue and Vincennes Avenue brackets to carry lights to be furnished by the city, which is also permitted to use the poles for its police and fire-alarm wires.

**Kewanee & Eastern Electric Railway, Kewanee, Ill.**—This company has filed a permit with the Public Utilities Commission of Illinois to construct a 120-mile line from a point opposite Muscatine, Iowa, to Streator, Ill. C. G. Lampman, Cedar Rapids, is interested. [Sept. 9, '16.]

**Illinois Traction System, Peoria, Ill.**—This company is reconstructing its tracks on West Market Street, Bloomington. That portion of the extreme west end of the line which has not been used for a number of years will not be relaid. The company is also reballasting its tracks on



North Center Street, Bloomington, preparatory to the installation of a new pavement.

**\*Boone, Iowa.**—Plans are being made to construct a line from Woodward to Boone. The Boone Commercial Association is interested.

**Tri-City Railway Company of Iowa, Davenport, Iowa.**—This company is planning the installation of another curve at Twentieth Street and Third Avenue. The company is also double-tracking its line to the Watch Tower and is making improvements on the track on Forty-third Street and Seventeenth Street, Moline, Ill.

**Des Moines (Iowa) City Railway.**—Double-tracking the entire Clark Street line will be done next spring if the city is able to put through a plan to widen the streets from Twelfth and Center Streets to Thirteenth and Clark Streets. City Engineer Kastberg has been asked to estimate the damages and expense of the proposed improvement. The first part of the work is planned to be the filling of Center Street from Ninth to Twelfth Streets. At one point the fill would be 4 ft.

**Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.**—The plans of the Kansas City, Kaw Valley & Western Railway for entering Lawrence over the new bridge have been forwarded by a recent decision of the Supreme Court of Kansas, which allows plans for the bridge to proceed. A citizen had asked an injunction against the construction, on the ground that it would cost more than \$200,000, the limit which a county may spend on a bridge. The court declared that since the county would pay only \$200,000 of the cost, the remainder to be paid by the Santa Fé Railroad, the injunction could not stand. The railway is now entering Lawrence over a temporary bridge.

**Cumberland & Manchester Railroad, Manchester, Ky.**—Plans are being considered by this company for the construction of an extension from Manchester to Beattyville. M. E. S. Posey, Barbourville, chief engineer. [Aug. 12, '16.]

**Great Northern Railroad, St. Paul, Minn.**—Plans are being worked out by the Great Northern Railroad for the electrification of more than 300 miles of main line between Spokane and Seattle and other mountain divisions in the West. The Great Northern Railroad, through a subsidiary company, controls water rights on Lake Chelan, in Washington, and the present plans, it is said, include the raising of the level of Lake Chelan, near which the main power plant would be established. It is understood that actual preliminary work on the project will be started by next summer.

**\*Biloxi, Miss.**—Plans are being considered by the Biloxi Vegetable and Fruit Growers' Association for the construction of a line between Biloxi and Ocean Springs. Two propositions for a right-of-way are under consideration, one to traverse the ridge part of Back Bay and the other along the water front.

**Kansas City (Mo.) Railways.**—Work will be begun at once by this company on the construction of a line on Thirteenth Street from Minnesota Avenue to Central Avenue. A line will also be built on Eighteenth Street south from Central Avenue to Kansas Avenue, crossing the new Kansas Avenue Viaduct.

**St. Joseph (Mo.) Electric Railway.**—Extensive improvements to its system are being planned by the St. Joseph Electric Railway.

**United Railways of St. Louis, St. Louis, Mo.**—The annual report of the Director of Public Utilities, recently submitted, contains a plan to elevate the tracks of the Hodiament Street line of the United Railways from Vandeventer Avenue and Morgan Street to Hodiament and Maple Avenues. The plan provides for the construction of reinforced concrete walls for the elevated railway, with a 16-ft. clearance on each street. The cost is estimated at \$600,000. The Hodiament line east of Vandeventer Avenue would become an express line, with stops only at Grand Avenue, Garrison Avenue, Jefferson Avenue, Eighteenth Street and all streets east of Thirteenth Street. Plans for the building of a subway to connect with the elevated are contained in the report. The subway would be built under Morgan and Franklin Avenues, connecting with the elevated at Vandeventer Avenue. The extension of the Hodiament line

west on Maple Avenue to the Creve Coeur Lake tracks is suggested.

**International Railway, Buffalo, N. Y.**—The 70-mile gale which swept western New York Oct. 16 caused great damage on the Lockport & Olcott division of the International Railway, and no cars were operated over the line for almost thirty-six hours. Miles of poles were broken, wires were leveled and the Olcott sub-station was temporarily put out of commission. The Buffalo, Lockport & Rochester line was tied up for a short time during the worst of the gale.

**Interborough Rapid Transit Company, New York, N. Y.**—Bids will be received by the Public Service Commission for the First District of New York until Nov. 9 for the construction of signal towers for parts of the Seventh Avenue-Lexington Avenue, White Plains Road and Queensboro Subway Rapid Transit Railroads. Further information may be obtained at the office of the commission, 120 Broadway.

**Rochester (N. Y.) Connecting Railroad.**—The Public Service Commission for the Second District of New York has denied the application of the Rochester Connecting Railway for a certificate of convenience and necessity and approval of the exercise of its rights and franchise. This proposed road was the complement of the proposed Niagara River & Eastern Railway to afford east and west outlets to the Buffalo, Lockport & Rochester Railway, and it was projected so that the three properties might eventually form a connecting link in a new transcontinental trunk line through the extension of the Canadian Northern Railway to the Niagara Gorge and the building of a new international bridge. The Rochester Connecting Railroad was to connect the eastern end of this system with the Pennsylvania and Erie Railroads at Rochester. The commission recently denied the application of the Niagara & Eastern Railway upon the ground that the rest of the project was still too indefinite.

**Northern Ohio Electric Corporation, Akron, Ohio.**—This company has been organized with a capital stock of \$6,375,000 to take over the property of the Northern Ohio Traction & Light Company.

**Ardmore (Okla.) Railway.**—It is reported that bids will be opened this month or early in November by the Ardmore Railway for the construction of its proposed line from Ardmore to the Fox oil fields. The route has not yet been definitely decided upon, but surveys are in progress.

**\*Hamilton, Ont.**—It is reported that the City Council of Hamilton and the Hydro Commission are considering the construction of an electric incline railway on Sherman Avenue at a cost of about \$200,000.

**Toronto, Ont.**—The Toronto Suburban Railway has received permission from the Ontario Railway Board to extend its tracks on Davenport Road easterly from Bathurst Street.

**Toronto & York Radial Railway, Toronto, Ont.**—At a recent joint meeting of the Ontario Railway and Municipal Board and the Dominion Railway Commission the application of the town of Aurora for interswitching facilities between the Grand Trunk Railway and the Toronto & York Radial Railway was granted. A switch 1100 yd. long will be constructed by the Toronto & York Radial Railway, providing for the hauling of freight cars from the Grand Trunk line to the factories located on the west side of the town.

**Southern Oregon Traction Company, Medford, Ore.**—Work will be begun at once by this company on the construction of three miles of track between Medford and Jacksonville.

**Perkiomen Valley Traction Company, Collegeville, Pa.**—The Public Service Commission of Pennsylvania has granted the Perkiomen Valley Traction Company a certificate of public convenience to construct its proposed line from Collegeville to Green Lane. James L. Wolcott, Dover, Del., president. [March 11, '16.]

**Doylestown, Pa.**—Speaking before the Borough Council of Doylestown, Louis A. Kellich, of Philadelphia, an engineer, announced that the proposed new trolley line from Doylestown to Perkasio would be constructed and that the line will eventually connect Doylestown with Harrisburg.



A committee has been appointed to aid in bringing about this new transportation link, for which a franchise has already been granted in Doylestown. [March 18, '16.]

**Montgomery Transit Company, Norristown, Pa.**—Plans are being made by this company to construct an extension to Souderton.

**Ardmore & Llanerch Street Railway, Upper Darby, Pa.**—This company has begun double-tracking its Ardmore branch from the end of its double-track line near Oakmont to County Line Road, Ardmore.

**Philadelphia & West Chester Traction Company, Upper Darby, Pa.**—A contract has been awarded by the Philadelphia & West Chester Traction Company to William J. Torrington, Philadelphia, for grading, masonry and roadway construction on its lines.

**Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.**—A bridge will be constructed by the Womelsdorf, Richland & Myerstown Street Railway over the Lebanon branch of the Philadelphia & Reading Railway. R. J. Lawrence, 525 East Gates Street, Philadelphia, engineer. [Sept. 30, '16.]

**San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.**—A contract has been awarded by this company to J. H. Berryman & Company of Houston for the construction of the first 60 miles of its proposed line between Houston and San Antonio, and actual construction will soon be begun. At a recent meeting of the stockholders, Ed Kennedy, who promoted the road, retired as vice-president, and W. A. Reinhart, Houston, was elected to fill the vacancy. [Sept. 23, '16.]

**Paris (Tex.) Transit Company.**—This company has increased its capital stock from \$60,000 to \$80,000 and will improve and extend its street-railway system.

**Salt Lake & Los Angeles Railway, Salt Lake City, Utah.**—Plans are being made for the electrification of the Salt Lake & Los Angeles Railway and the construction of an extension to Garfield. Connections will be made with the Utah Light & Traction Company. A bond issue of \$300,000 to cover the cost will be floated at once and contracts let for both construction and power. The latter will be furnished by the Utah Power & Light Company.

#### SHOPS AND BUILDINGS

**Tri-City Railway Company of Illinois, Rock Island, Ill.**—Work has been begun by this company on the construction of a carhouse at Muscatine for both the city and interurban cars. The structure will be about 300 ft. long and about 60 ft. wide, of concrete or tile construction with a steel roof, and is to be so constructed that permanent additions can be made at any time. About half of the building will be fitted up as a machine shop. Clubrooms for street railway employees will also be provided for in the new structure.

**Worcester (Mass.) Consolidated Street Railway.**—This company plans to construct an addition to the carhouse of its valley division at North Uxbridge, which will double its capacity and add a large storage room for supplies at the rear of the structure. Plans have been drawn for the addition, which will be 20 ft. by 120 ft., one-story high, conforming to the architecture of the present carhouse. The new structure will extend back nearly 20 ft. beyond the present house and will give room for four extra tracks for storing cars. These new tracks will be built without the customary repair pits, as the barn is amply supplied with pits for this purpose. At the rear there will be a storage room for keeping sand, salt and other supplies. It will be fitted with a rear entrance so that teams can drive into the storehouse from the Elm Street side of the property.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—Plans are being made by this company to construct a new station at University Place, Princeton.

**New York Municipal Railway, Brooklyn, N. Y.**—The Public Service Commission for the First District of New York has awarded a contract to Louis Wechsler, New York City, for the construction of station finish for six stations on the new rapid transit lines. The contract price was \$382,521. Five of the stations are located on the new Seventh Avenue line. The sixth station under this contract is the Diagonal

Station at Forty-second Street, between Park and Lexington Avenues, near which the new Lexington Avenue line connects with the first subway. All work is to be completed within six months of the delivery of the contract, save for certain minor details.

**Jefferson County Traction Company, Beaumont, Tex.**—This company plans to construct a new brick station and make other improvements in Port Arthur.

**Texas Electric Railway, Dallas, Tex.**—The J. F. Strickland interests have purchased the block of ground bounded by Young, Jefferson, Wood and Market Streets, Dallas, and will construct thereon a new interurban express station. The tract lies one block east of the new union station of the railroads. Plans for the building have not yet been decided upon.

**Tacoma (Wash.) Railway & Power Company.**—The Tacoma Railway & Power Company is remodeling the Thirteenth Street corner of its carhouse to provide new quarters for the general offices of that company and the Puget Sound Electric Railway. In the new arrangement all the general offices will be on the first floor. The car finishing department, which formerly occupied that portion of the building, has been moved across the street to the first floor of the building in which the general offices are located. The men's recreation room in the basement at Thirteenth and A Streets has been moved to the Puyallup Avenue building, in which the freight offices are located. This building was recently remodeled at a cost of about \$4,500. The basement of the Thirteenth Street building will be used for a motor room and storage.

#### POWER HOUSES AND SUBSTATIONS

**Centerville Light & Traction Company, Centerville, Iowa.**—This company expects to erect a 33,000-volt, three-phase, 60-cycle transmission line from Centerville to Allerton, about 12 miles, after Jan. 1.

**Bangor Railway & Electric Company, Bangor, Me.**—A contract has been awarded to William E. Fish, Bangor, for the construction of this company's new substation at Corinth, and work will be begun at once.

**Detroit (Mich.) United Railway.**—This company is planning to modernize the boiler section of one of its two power plants in Detroit early in the coming spring. This is the plant, known locally as plant B, which contains steam turbines of a combined capacity of 10,500 kw. The changes contemplated are the substitution of six Stirling-type boilers for eight of the B. & W. type, the installation of forced-draft stokers and the building of a large brick stack. In providing further for the rapidly increasing demand for power it is proposed to contract with the Detroit Edison Company for from 3000 to 3500 kw. in addition to the present contract for 10,500 kw. This is in accordance with the policy of the company to purchase power wherever possible on its system in order to provide insurance against breakdown.

**Morristown & Erie Railroad, Morristown, N. J.**—In connection with the proposed electrification of its railroad from Morristown to Essex Fells, the Morristown & Erie Railroad Company will erect a substation in Morristown. Energy will be furnished by the Morris & Somerset Electric Company.

**Bristol (Tenn.) Traction Company.**—A contract has been awarded by the Bristol Traction Company to Robert Hutinson for the construction of a dam across the Holston River, near Big Creek. The power station at the dam will be equipped with three turbines capable of developing 1000 hp. The cost of the work is estimated at \$75,000.

**Texas Traction Company, Dallas, Tex.**—The power plant of the Denison-Sherman Interurban Company at Woodlake has been sold to the Stone & Webster Engineering Corporation and will be dismantled and shipped to Fort Worth. The Denison-Sherman Interurban is now a part of the Texas Traction Company and the power that operates the cars is generated in Fort Worth.

**Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.**—This company plans to erect a substation adjacent to Little Lake Butte des Morts to supply additional energy in Neenah.



## Manufactures and Supplies

### VENTILATOR MANUFACTURERS REPORT ACTIVITY

Several Large Orders Received—Difficulties of Street Car Ventilation—Purchasing on an Efficiency Basis—Need for Standardization

Several recent large orders for car ventilating equipment emphasize the statements made by ventilator manufacturers that business is steadily increasing. Last week the Chicago Surface Lines ordered 16,000 exhaust ventilators, and within the last few weeks the Public Service Railway Company ordered 800, and the Milwaukee Electric Railway & Light Company ordered 600. Definite attention has been actively directed to the car ventilation problem for only four or five years, but now the specification of exhaust ventilators for practically every car ordered and the sales of ventilators for installation on old monitor-deck cars point toward better days for the manufacturers of this type of car equipment.

A great deal of educational work has been necessary in order to bring the ventilator business to its present state. One of the noticeable features in this work has been the need for showing the railways that car ventilation was a real factor in good transportation service. The monitor-deck sash served its purpose for a great many years, but with the refinements in equipment and the use of the arch-roof car, the exhaust ventilator is now recognized to be an essential part of a car which has been designed to render full service to the public.

Experience in the design and installation of ventilators has proved that the street railway car offers a more difficult problem for the ventilation engineer than does the steam coach. This is largely due to the difference in service conditions. The differences lie in the frequent stops, rush-hour loads, and comparatively low speed of the street car as compared with the smaller loading, higher average speed, and fewer stops of the steam coach. The length of stopping time plays an important part in ventilator design, because when a car is standing and the wind is blowing at right angles to the track there is a tendency for the ventilators on one side of the car to act as intakes and those on the opposite side to act as exhausts, thus changing the operating conditions as compared with those when the car is moving and all ventilators are exhausting.

The first car ventilators of any kind were designed because of the need for changing the air in refrigerator cars. Next came the steam-coach ventilators and later the electric-car types. With the advent of the fully-inclosed car, the need for air intakes as well as exhaust ventilators presented itself. And now the development points toward an automatically-balanced or compensating system including intake and exhaust ventilators so designed that the intakes supply fresh air in an amount to balance that withdrawn by the exhaust ventilators. A compensating intake ventilator exhibited at the Atlantic City convention attracted considerable attention. This unit is designed for mounting on the car roof, and it is so arranged and adjusted that the amount of fresh air fed into the car is uniform at various speeds of the car and various wind pressures. The total amount admitted under any condition also is limited.

One of the selling problems of the ventilator manufacturer has been that of educating the electric railways to buy ventilation equipment on an efficiency basis. There has been a tendency until recently to install low-priced devices without definite regard for their mechanical efficiency in the removal of definite quantities of air. For a time it looked as though ventilating equipment was being bought on price rather than on quality of product. But the manufacturers have recommended and urged the sale of those devices which are known from broad experience to be the most efficient ventilators. Such devices cost more to manufacture and from the car-service standpoint are worth far more to the railroad than mere coverings for roof openings.

As a matter of fact, it was difficult at the start of the ventilator selling campaigns a few years ago to convince the mechanical officers of the roads how much it actually cost to manufacture a good ventilator. The master mechanic would say, "How do you people ever expect to justify a price like that on a sheet-metal box?" But whenever a road has attempted to build its own ventilators, justification for the manufacturers' price has been found in the high labor cost for shaping, forming and assembling ventilators. The prices for standard types of exhaust ventilators now range from \$3.50 to \$7.50, depending on the performance of the units. It is difficult to see how any reduction in these prices can reasonably be expected. However, one manufacturer points out that if the purchaser will agree he can manufacture ventilators more economically by using black sheet iron and spot welding it than by the present practice of using galvanized iron and riveting it. The black iron ventilators could be dipped in enamel and baked so that they would be rust-resisting.

Standardization of the ventilation openings also might make possible an economy in manufacture. As conditions now exist practically every ventilator order is a custom-made job. This is particularly true for the deck-sash ventilators. A standard size ventilator hole would enable the manufacturers to simplify their work, reduce the number of dies and make ventilators for stock. It is now the practice to specify ventilators by certain sizes, these sizes being the dimensions of the hole in the monitor deck or through the arch roof. If, through the American Electric Railway Engineering Association's committee on equipment and with the co-operation of the car builders, standard ventilator opening dimensions could be adopted and accepted by the operating companies, then the ventilator manufacturers would be in a position more economically to manufacture advance stocks and thus accelerate deliveries.

The tendencies in the ventilator trade are toward the acceptance of a combined system to include separate intake and exhaust units. The practice on many roads also points toward delivering the air below the breathing line after first having warmed it. The prospects for ventilator orders depend now very largely on the orders placed for new cars, but the general increase in business is also dependent on orders for ventilators to be installed on old equipment.

### LABOR IN THE INDUSTRIAL FIELD

It Is Constantly Obtaining an Increased Share of the Profits of Manufacture

In these days of labor disputes in industrial undertakings it is of value to note that labor is constantly receiving an increased share of the profits of manufacturing. This statement, long maintained by economists, receives confirmation from statistics recently issued by the Census Bureau showing the situation in 1914 and in the three preceding five-year periods. A digest follows:

	Percentage of Increase		
	1904 over 1899	1909 over 1904	1914 over 1909
Capital employed .....	41.2	45.4	23.7
Primary horsepower .....	33.6	38.5	20.7
Wage earners, average number.....	16.0	21.0	6.4
Total wage payments.....	30.0	31.0	19.0
Value of products.....	29.7	39.7	17.3
Value added by manufacture.....	30.3	35.5	15.8

A careful inspection of this table shows, first, that the percentage of increase of capital in 1914 over 1909 is less than during either of the other periods, indicating that the profits were less. It also shows that the increase in the number of wage-earners was less than that of amount of capital, total wage payments or value added by manufacture. This indicates an increase in the proportion that capital contributes to the finished product as compared with the part contributed by labor, as well as a higher wage payment per employee. In other words, the wage-earners not only gain in wages but they have their manufacturing done for them at lower cost through the increasing use of capital. In a statement by The National City Bank of New York it is pointed out that if the wage-earner's position does not improve absolutely, the explanation must be found in the prices of materials and other things outside of the field in which labor and capital are the chief factors.



In 1899 the amount of capital employed in manufacturing was \$1,770 to each person employed, in 1904 it was \$2,117, in 1909 it was \$2,448 and in 1914 it was \$2,848. Every increase in the supply of capital makes an additional demand for labor, and with capital increasing faster than population, as it does, there is bound to be an upward tendency in wages. The 1916 figures would be interesting, if available.

#### BROOKLYN ORDERS COASTING RECORDERS

The New York Municipal Railway Corporation, which operates the extensive rapid transit lines built or building in Brooklyn and part of New York, has placed an order with the Railway Improvement Company for 300 type "H" coasting recorders, a number of Rico terminal clocks and other supplies. The present order will take care of all the New York Municipal cars now in service, but the railway has the option of ordering 600 additional recorders at the same price on or before June 1, 1917. In accordance with an agreement with the City of New York, the purchase of all equipment by the operators of the new rapid transit lines is subject to review by the Public Service Commission, First District. Following this procedure the commission has given its approval to the purchase of 900 coasting recorders by the New York Municipal Railway.

#### BEMIS CAR TRUCK COMPANY ACQUIRES ALL RIGHTS TO LORD BALTIMORE TRUCKS

A change of importance to the users of Lord Baltimore trucks is the acquirement from the Baltimore (Md.) Car Wheel Company by the Bemis Car Truck Company, Springfield, Mass., of all the former company's patent rights, good-will, patterns, etc., covering the manufacture and maintenance of Lord Baltimore trucks. The Bemis Company announces, through Warren L. Boyer, president, that it will soon be able to supply all orders for replacement parts of these trucks.

The purchase of the Lord Baltimore truck rights by this company is a logical expansion of its present business in the manufacture of case-hardened and manganese specialties for trucks of all kinds. Recently the company has added a fine-thread turnbuckle to its other products. The shops at Springfield have lately been equipped with additional machinery to help the company handle expeditiously its largely increased business.

#### ROLLING STOCK

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is reported as considering the purchase of ten one-man cars.

Mobile, Volanta & Pensacola Railroad, Volanta, Ala., is in the market for one gasoline or gas-electric car seating not less than thirty passengers.

Towson & Cockeysville Electric Railway Company, Towson, Md., recently placed in operation an 18-ft. storage-battery car built by The J. G. Brill Company, Philadelphia.

United Railways & Electric Company, Md., noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 14, 1916, as being in the market for seventy-five double-truck, semi-convertible, four-motor, pay-within cars, has ordered this equipment from The J. G. Brill Company of Philadelphia, Pa.

#### TRADE NOTES

General Electric Company, Schenectady, N. Y., has received an order for seventy-five four-motor GE-200 equipments with type K control from the United Railways & Electric Co., Baltimore, Md.

Consolidated Car-Heating Company, Albany, N. Y., has received an order from the Boston Elevated Railway for 100 equipments of pneumatic door engines for the 100 new cars which this company recently ordered.

Westinghouse Air Brake Company and Westinghouse Traction Brake Company, Pittsburgh, Pa., have received an order for the straight air brake equipment to be used on the seventy-five cars of the United Railways & Electric Company of Baltimore, Md.

Holden & White, Chicago, Ill., general sales agents for the Garland Ventilator Company, have received an order

from The Milwaukee Electric Railway & Light Company for 600 Garland ventilators for fifty new cars.

The Grayson Railway Supply Company, St. Louis, Mo., will hereafter represent Holden & White, Chicago, Ill., in the sale of Perry anti-friction side bearings and Hartman centering center plates in Texas, Oklahoma, Arkansas, Louisiana and western Tennessee.

Nordberg Manufacturing Company, Milwaukee, Wis., builders of steam and electric hoists, Corliss engines, poppet valve engines, air compressors, oil engines and Nordberg-Carels Diesel engines, announce the appointment of H. W. Dow as sales manager. Mr. Dow has been associated with this company in the engineering and sales departments for twelve years.

G. A. White, formerly metallurgist of the American Sheet & Tin Plate Company, is now associated with the Titanium Alloy Manufacturing Company of Niagara Falls, N. Y., in the same capacity. Prior to his connection with the American Sheet & Tin Plate Company, Mr. White was for a considerable time with the Rock Island Railroad and also with the Eastern Steel Company, Pottsville, Pa., where he was engaged in the manufacture of structural material.

Roller-Smith Company, New York, N. Y., announces that it is now represented in Seattle, Wash., by C. K. Hillman, Pacific Block Building. Mr. Hillman will handle Roller-Smith instruments, circuit breakers and Columbia meters in Washington, Alaska, and parts of the States of Oregon and Idaho. This company has recently added Charles E. Kahant to its sales organization. Mr. Kahant will be connected with the main office at 233 Broadway, New York City. He has specialized in radio work for the past eight years and for the past four years had occupied the position of assistant manager of the Atlantic Communication Company, 90 West Street, New York, N. Y.

#### ADVERTISING LITERATURE

Chicago (Ill.) Varnish Company has issued a pamphlet on its "Ce Ve" process of steel car painting.

Spray Engineering Company, Boston, Mass., has issued an illustrated folder describing its new "Spraco" paint gun for all kinds of painting.

Electrose Manufacturing Company, Brooklyn N. Y., has issued its No. 14 bulletin describing and illustrating railway overhead, surface and underground line insulators.

Columbia Nut & Bolt Company, Bridgeport, Conn., has issued a pamphlet describing and illustrating its Columbia lock nut, and square and hexagon gib nuts.

Aberthaw Construction Company, Boston, Mass., has just issued a preliminary report on the "Effects of Vibration in Structures." In this report are incorporated a number of vibration records of buildings showing rates of vibration due to different disturbances. A unique device described is the vibration recorder, which is modeled on the principle of the seismograph originally developed from the study of earthquake phenomena.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued its publication No. 1574, describing and illustrating the maintenance of equipment in the Harvard shops of the Cleveland (Ohio) Railway Company, which were described in the *ELECTRIC RAILWAY JOURNAL* of Jan. 23, 1915, page 168 and Feb. 19, 1916, page 344. This seventy-five-page publication contains more than 100 halftones and is neatly bound in a four-color cover. In addition to covering the work done at the Harvard shops of the company, it includes an account of the work done at the operating stations, such as inspections, repairs, etc., including the washing and cleaning of cars. One of the most interesting sections is that devoted to shop practices. Both the old and new ways of removing trucks from car bodies, removing armatures from box or split-frame motors, cleaning motors after removal from trucks, and removing pinions, are illustrated and described. In addition, all of the practices of the armature room, such as blowing out, rewinding and soldering armatures, are given in detail. The latest up-to-date methods of repairing field coils, banding armatures, slotting commutators, and dipping and baking armature coils are also described. This is an excellent publication from the maintenance viewpoint and should be of great interest to master mechanics and maintenance men in general.





## Eric or Compensation

Under the old Brehon laws of Ireland a fine was provided for almost any kind of homicide or bodily injury.

But as money is a poor form of revenge, the injured person's friends sometimes got busy and secured further satisfaction outside of the courts.

So, too, when a railway settles for a preventable accident, the money does not wipe out all anguish or hard feeling.

It is the **prevention** of accidents that makes friends for a public utility.

**PEACOCK BRAKES** not only cost less than accident compensation; they also improve public relations.



The Eccentric  
Drum

**National Brake Co.**  
Buffalo, N. Y.



# Bankers and Engineers

## Electric Railway Lighting and Power Company Bonds

ENTIRE ISSUES PURCHASED

### THE NATIONAL CITY CO.

NATIONAL CITY BANK BUILDING  
55 WALL STREET, NEW YORK

## THE J-G-WHITE COMPANIES

ENGINEERS  
FINANCIERSCONTRACTORS  
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Underwrite Entire Bond Issues of Street Railway, Electric Light, Power and other Public Utility Properties Situated in the Larger Cities

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## ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER POLYTECHNIC INSTITUTE  
WORCESTER, MASSACHUSETTS

## Arthur D. Little, Inc.

An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.

Correspondence regarding our service is invited.

93 Broad Street, Boston, Mass.

## WOODMANSEE & DAVIDSON, Inc.

### ENGINEERS

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784 Continental &amp; Commercial Nat'l Bank Bldg.



## STONE & WEBSTER ENGINEERING CORPORATION

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NEW YORK,  
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Purchase, Finance, Construct and Operate Electric Light Gas, Street Railway and Water Power Properties.

Examination and reports. Utility Securities Bought and Sold.

## SANDERSON & PORTER ENGINEERS

REPORTS • DESIGNS • CONSTRUCTION • MANAGEMENT  
HYDRO-ELECTRIC DEVELOPMENTS

### RAILWAY, LIGHT AND POWER PROPERTIES

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## ROBERT W. HUNT & CO., Engineers

BUREAU OF INSPECTION TESTS & CONSULTATION  
Inspection and Test of all Electrical Equipment

NEW YORK, 90 West St.

ST. LOUIS, Syndicate Trust Bldg.

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## D. C. & WM. B. JACKSON ENGINEERS

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HARRIS TRUST BLDG.BOSTON  
248 BOYLSTON ST.Plans, Specifications, Supervision of Construction  
General Superintendence and Management  
Examinations and Reports  
Financial Investigations and Rate Adjustments

## Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans NEW YORK San Francisco

## Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy, sell, rent or exchange.

They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have.

The cost is a trifle, the results considerable.

Get Your Wants into the Searchlight

## GULICK-HENDERSON CO.

Inspection Railway Equipment &amp; Materials

PITTSBURGH

CHICAGO

NEW YORK

## ROOSEVELT & THOMPSON

71 Broadway

ENGINEERS

New York

Report, Investigate, Appraise, Manage Electric Railway, Light and Power Properties.



# AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes particularly* **BRIDGES AND BUILDINGS**



Transmission Towers at Birmingham, Alabama. Alabama Power Company.

#### SALES OFFICES

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Atlanta, Ga., Candler Building	U. S. Steel Products Co. Pacific Coast Dept.
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	Seattle, Wash., 4th Ave. So. Cor. Conn. St.

#### Export Representative:

United States Steel Products Co., 30 Church St., N. Y.

## The Men Who Plan and Execute

owe some of their efficiency to the thought, energy and resourcefulness of manufacturers who supply the means for such achievements.

These men know how important it is for them to keep in touch with the manufacturers.

In the electric railway industry, such men find the easy, certain and thorough way to keep in touch with manufacturers is through the advertising pages of the

**Electric Railway Journal**

239 West 39th Street

New York

## The Art of Buying

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Service Department is ready to serve you, Mr. Manufacturer.

#### THE P. EDW. WISCH SERVICE

Suite 1710

DETECTIVES

Suite 715

Park Row Bldg., New York

Board of Trade Bldg., Boston

#### ELECTRICAL TESTING LABORATORIES

Electrical, Photometrical and Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

#### EDWARD P. BURCH, Engineer

ELECTRIC RAILWAY VALUATIONS

Dime Bank Bldg., Detroit

Plymouth Bldg., Minneapolis

#### Scofield Engineering Co. Consulting Engineers

PHILADELPHIA, PA.

POWER STATIONS

GAS WORKS

HYDRAULIC DEVELOPMENTS

ELECTRIC RAILWAYS





# Thousands of Columbia Trolley Poles Ready for Immediate Shipment



For 1½-inch and 2-inch Base Harps and for lengths of 11-feet to 15-feet. All Poles are Lap-Welded.



Columbia-made Trolley Poles Are Made Right

Here are some Columbia-made specialties conveniently listed:

## TOOLS

- Armature and axle straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

## CAR EQUIPMENT

- Armature and field coils
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail contact shoes and accessories
- Trolley poles (steel) and wheels



## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.





# It's what others say that counts

Seldom has any book or set of books in recent years received such hearty endorsement at the hands of electrical workers throughout the country as the Home Study Course in Practical Electricity, by Radcliffe.

The explanation—seldom has any book or set of books adhered so closely to actual work in the electrical field.

W. H. Radcliffe received his education in electricity at the Lawrence Scientific School of Harvard University and later became electrical expert for the General Electric Company, the largest electrical company in America.

His long, valuable and varied experience in electricity has brought him in touch with the actual daily requirements of the electrical worker—and as the accompanying letters will show, he has accomplished his purpose of supplying these requirements in book form.

The hundreds of problems which have for so long puzzled the practical man are now rounded up and explained in questions and answers. The questions are the kind you would ask, and the answers, short but adequate, are by Radcliffe. Each question is indexed and numbered, so that no time is wasted in getting at the desired information.

## Every reader of the Electric Railway Journal is entitled to free examination

We so firmly believe that every reader of the Electric Railway Journal—in fact everyone who has to do with electricity—will be interested in this innovation in the electrical book world, that we hereby agree to send the three volumes absolutely free for ten days' examination to any one who will return the attached coupon. If for any reason whatever the books are not wanted after inspection we will supply return charges. There will be no argument about this, and of course no agents will bother you.

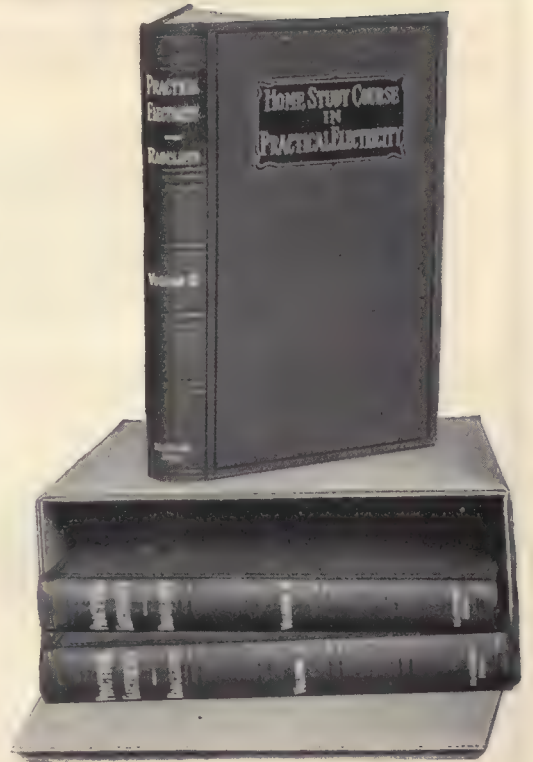
In case the books are entirely satisfactory you need pay only \$1 per month for six months. But pay nothing until you decide the books will be worth to you more than the small price we have placed on them.

**McGraw-Hill Book Co., Inc.**

239 West 39th Street

New York

*Publishers of books for Electric Railway Journal*



### We did not ask for these letters. It will be worth your time to read them.

McGraw-Hill Book Company, Inc.,  
New York City.

Gentlemen:

The three books on electrical engineering which you sent me subject to examination have been received, and I am very well pleased with them, so much so that I am willing to have you refer prospective customers to me.

Very truly yours,

Harry J. Badcon,

306 So. Della St.,  
Ludington, Mich.

McGraw-Hill Book Company, Inc.,  
New York City.

Gentlemen:

The set of Practical Electricity received. I am so well pleased with the plain, practical and to-the-point method of handling the technical features of electrical work that I will not withhold my decision any longer, so am inclosing the full price of the books.

Very respectfully,

Shelby M. Armacost,  
Care of Marconi Co.,  
Bolinas, Calif.

McGraw-Hill Book Company, Inc.,  
New York City.

Gentlemen:

Find inclosed a payment on the Home Study Course in Practical Electricity. They are very fine books; easy to comprehend and thorough in every essential point.

Very truly yours,

John L. Ferris,  
Box 6, Rye Valley, Oregon.

McGraw-Hill Book Company, Inc.,  
New York City.

Gentlemen:

I received the Home Study Course in Practical Electricity, and I am very well satisfied. They are the best books I have ever seen in that form.

Yours truly,

William W. Savol,  
No. 6 Searle Ave.,  
Easthampton, Mass.

McGraw-Hill Book Company, Inc.,  
New York City.

Gentlemen:

I have received your Home Study Course in Practical Electricity, and I am well pleased with the same. The best feature about them is their being so thoroughly up to date. I had long been looking for some information on auxiliary pole magnets but could not find it until I purchased these books. The author uses but few words, but he makes his answer plain.

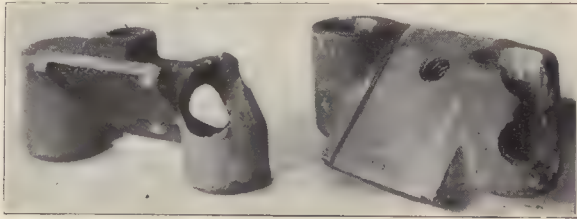
Yours very truly, J. R. Smothers,  
306 East McIlroth,  
Harrisburg, Ill.

**NO  
MONEY  
DOWN**

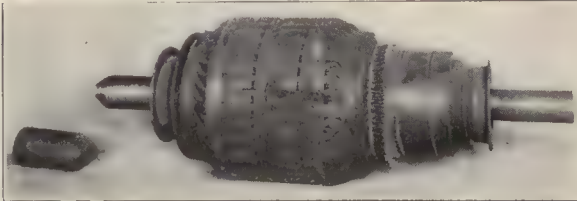
**FREE EXAMINATION COUPON**  
McGraw-Hill Book Company, Inc., 239 West 39th St., New York  
Gentlemen:—Please send to me, charges paid, the Home Study Course in  
Practical Electricity, three volumes price \$6.00. I agree to examine the  
books carefully and if satisfactory will remit books are not wanted  
balance at the rate of \$1 per month. I will write you for shipping directions.  
Signature \_\_\_\_\_  
Residence Address \_\_\_\_\_  
City and State \_\_\_\_\_  
Where Employed \_\_\_\_\_  
Occupation \_\_\_\_\_  
E.R.J. 10-23



## Oxy-Acetylene Welding and Cutting



Brush holder supports, value when new, \$3.48. Had been laid aside as junk, reclaimed in 15 minutes at a cost of 45c.



A saving of \$5 was made in repairing this armature shaft by the Prest-O-Lite Process. Illustration shows parts prepared for welding.

## Typical Repair Savings Made by Welding

The repairs shown above are typical of many made the first day a Prest-O-Lite outfit was used in the East St. Louis and Suburban Shops.

Go through *your* shops and see the expensive replacements you can avoid by utilizing oxy-acetylene welding for repairing and putting back into service many broken or worn metal parts.

Look over *your* junk pile and see if you have not a ready-made opportunity to make decided savings with this simple, low-cost welding process. It pays its way from the start.

Progressive roads everywhere are finding oxy-acetylene welding a valuable routine process for everyday shop repair and construction work. They do not confine the use of this process to a few jobs, but profit on nearly every shop, yard or track repair because of the greater simplicity and economy.

## Prest-O-Lite PROCESS

Employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready-made carbide gas) is backed by Prest-O-Lite Service, which provides dry, purified gas, insuring better welds, quicker work, and lower cost, and also avoids the large initial outlay and heavy depreciation incurred in making crude acetylene in a carbide generator.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for \$60 (Canada, \$75); acetylene service at additional cost. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe. Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene—any average workman who understands metals can learn the process quickly and easily.

Write for special literature on economies effected in the electric railway field by the Prest-O-Lite Process. Also for details of Prest-O-Lite Gas-Weld Rail Bonding. Sent free to those interested.

### The Prest-O-Lite Co., Inc.

The World's Largest Makers of Dissolved Acetylene

Main Office and Factory Canadian Office and Factory  
805 Speedway, Indianapolis, Ind. Merritton, Ontario

53 Branches and Charging Plants



## Blot Out the Cause

# ROT



Rot is one of the mighty forces that is always working to the detriment of the maintenance engineer and the company's earnings. Sometimes it's called corrosion, or electrolysis—but with wood it's plain r-o-t.

## Reeves Wood Preserver

Will mitigate the effects of rot in poles, cross-arms, ties, and all kinds of construction timber.

It is applied COLD with a brush (like paint) or by dipping in an open vat. It penetrates like ink into a blotter and checks rot in its incipency. The least it will do is to double the life of wood. The most it will cost is but a trifle compared to the savings it will effect in purchases of new material and the cost of erection.

No, it will not corrode the hardware, wash or sweat out. You can prove it yourself with our test outfit.

Write for it to-day



## The Reeves Co.

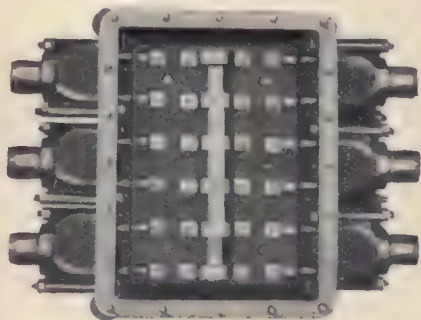
New Orleans, La.

THE EASY WAY TO PREVENT DECAY



## Let us work together in designing your Underground Distribution Boxes

When planning your underground extensions and renewals let us give you the benefit of our years of experience in solving such problems for Electric Railways.



Even though conditions call for the unusual in distribution or special precaution peculiar to your case, we can offer a design to meet that condition.

This is not only a time-saving suggestion, but an economical one as well.

By your approval of our designs in blue print form, we can produce the material directly from them without incurring engineering expense on your part.

Our stock of "Noark" patterns for standard and special Subway Boxes is very extensive—we can save you time and money by designing and building your requirements. Confer with the Electrical Department in any J-M Branch.

*Serves more people in more ways than any  
other Institution of its kind in the world.*



*Branches  
in all  
large cities*

**H. W. JOHNS-MANVILLE CO.**  
EXECUTIVE OFFICES  
296 Madison Avenue, New York City

## For Safety and Economy Use Quality Products

# *Western Electric*

Electrical Supplies are  
held ready for shipment at

## 32 Distributing Houses

one of which is near you  
—and a list of which is  
below.

Our electrical supplies are  
all quality products and  
cover everything electrical.

Let our nearest house quote  
you on your electrical needs.

## *Western Electric Company*

INCORPORATED  
New York Atlanta Chicago Kansas City San Francisco  
Buffalo Richmond Milwaukee St. Louis Oakland  
Newark Savannah Indianapolis Dallas Los Angeles  
Philadelphia New Orleans Detroit Houston Seattle  
Boston Birmingham Cleveland Oklahoma City Portland  
Pittsburgh Cincinnati Minneapolis St. Paul Omaha Denver Salt Lake City

EQUIPMENT FOR EVERY ELECTRICAL NEED.  
Member Society for Electrical Development. "Do it Electrically"



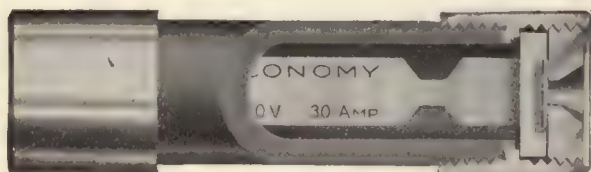


## Protect Cars and Power-plant

Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

### ECONOMY renewable cartridge FUSES

when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



There's no need to use an extra new fuse every time one blows when the *efficient and safe* Economy fuse can be renewed over and over again with our *tested* Renewal Links at a saving of 80% of fuse maintenance expense under old-style, wasteful methods.

*Write now for Bulletin No. 17 and our catalog.*

**Economy Fuse & Mfg. Co.**  
Kinzie and Orleans St.  
Chicago, Ill.

## The On-Time Advertiser

who gets his copy and cuts to us well before the day his advertisement should go to press, gets better type composition, better location and a better opportunity to make necessary corrections on the proofs, which can then be submitted before publication.

## The Last-Hour Advertiser

whose copy and cuts come in at the last minute or even later, gets the best attention we can possibly give him. We work overtime to do what we can for him. But the lack of sufficient time makes it physically impossible to do as well for him as for the advertiser whose instructions come in well before the last hour.

## Get Your Copy and Cuts in Early

Do this, not on our account, but for the sake of your own advertising. We want to serve all advertisers equally well—but we can't put more hours into a day, and the advertiser who gives us the most time gets the best results.

Copy and cuts should be in our hands by Thursday of the week preceding the date of issue. This means that Thursday is the *last* day on which copy can be handled normally.

After that we cannot promise proofs, and we cannot insure classification.

For good advertising, get your cuts and copy in every week *before* Thursday.

**Electric Railway Journal**  
239 West 39th Street, New York



# Southern Wisconsin Ry. & Light Co.

Specify

## H. B. LIFE GUARDS

for their

Five New Cars

### THE CONSOLIDATED CAR FENDER CO.

Providence, R. I.

General Sales Agents

**WENDELL & MAC DUFFIE CO.**

61 Broadway, New York

## INTERNATIONAL C16

### A Money-Counting Fare Box for One-Man Cars



Successful operation of one-man cars depends largely on simplifying the car operator's work in collecting and registering fares.

The motorman-conductor ought to be relieved, if possible, of pulling register cords and of carrying a lot of change.

The International C16 was designed to meet this need. It receives the fare from the passenger, counts the money and then makes available the collections to the operator for change.

The C16 is easily carried from one end of the car to the other.

Your one-man cars are entitled to the best. Give it to them by installing the C16.

**The International Register Company**

15 South Throop St., Chicago, Ill.



The demand for our material is so great that we earnestly recommend our customers to anticipate their needs as much as possible.

**STANDARD  
STEEL WORKS CO.**

Morris Building Philadelphia

New York  
Chicago  
St. Louis  
Pittsburgh  
San Francisco  
Richmond

Portland  
Havana, Cuba  
London, Eng.  
Melbourne, Aust.  
Monterey, Mex.  
Mexico City

**Standard Steel Works Co.**  
Morris Building, Philadelphia, Pa.



Keep your cars in constant service by using

# GRIFFIN F. C. S. WHEELS



All minor irregularities that develop in service can be quickly and economically eliminated by the use of a pit grinder.

The cost of grinding is nominal; the loss of metal from the treads is not excessive, and a maximum of mileage is obtained.

All of our foundries are equipped with complete machine shop facilities for pressing wheels on axles.



**Prompt Deliveries Assured**

## GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

Chicago

Denver

Detroit

St. Paul

FOUNDRIES

Boston

Tacoma

Los Angeles

Kansas City





One of fifteen new  
**Jewett Steel Cars**

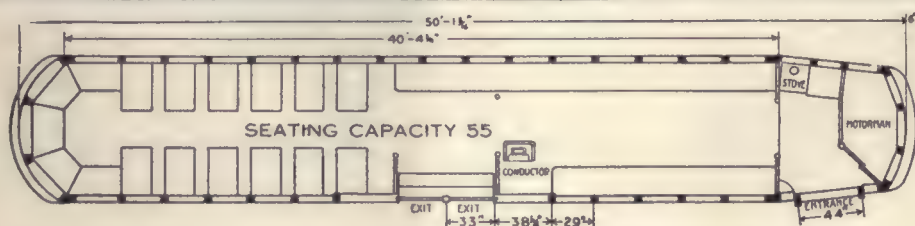
Ordered by the Northern Ohio Traction & Light Co.

Seven of them have baggage compartments—eight have smoking compartments. All have spacious white enameled saloons with running water, etc. Pressed steel posts—steel plates throughout—steel grained mahogany interior finish—chanarch and composition flooring with battleship linoleum in aisles—these are some of the details of these “cars of character.”

*Let us bid on your specifications.*

**THE JEWETT CAR CO., Newark, Ohio**

# The Car Rider's Car



**I**N a 50-ft. “Car Rider’s Car” the loading space in the front part will accommodate sixty seated and standing passengers! Think what this means—large groups of passengers going aboard two at a time and making no demand on the attention of the conductor till they leave in smaller groups, when it is easy to collect their fares quickly. Passengers going to the rear half of the car pay their fares as they pass the conductor near the center. This is the only modern-fare-collection car to have a lobby as well as a vestibule, and a capacious lobby at that. That is why it can load in

less than half the usual time—why it reduces running time and maintains schedules. The arrangement furnishes much extra safety, comfort and convenience through its doing away with crowding and jostling of passengers going two ways at once, waiting on the platform and on the pavement for those ahead to pay their fares, having to step aside and wait if they haven’t the exact change ready and other aggravating experiences well known to the public. The popular favor which it has achieved is the reason for its name—“The Car Rider’s Car.”

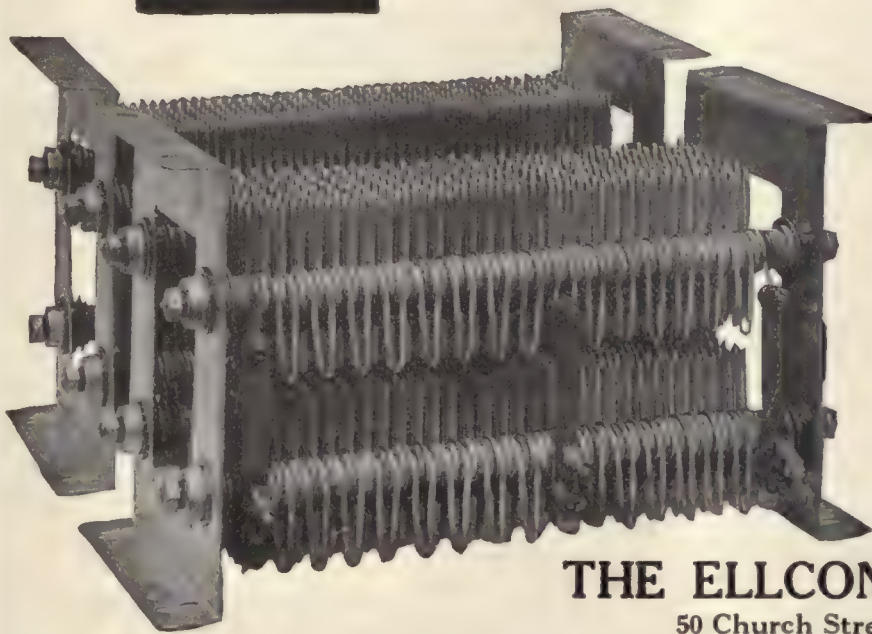
**PETER WITT, 630 Leader Building, CLEVELAND**



## There's Percentage in Buying

# FMB Resistors

**95 % Jointless**  
**100 % Troubleless**



Not because we say so, but because exacting railway conditions have proved them so. How can a drawn grid resistor be otherwise?

Drawn grids are never brittle, never non-uniform in cross-section, never strained by the expansion and contraction attendant on rapid heating and cooling. They are always lighter in weight and better in resisting rust and corrosion than cast grids.

And remember there are only five or less joints in a drawn grid to every hundred in a cast grid. You know what that means in eliminating trouble.

### THE ELLCON COMPANY

50 Church Street, New York

## On Ball, Web or Base—It's All One to the Lincoln System

—equally adapted for all these methods of bonding.

The electric arc blends the copper of the bond and the steel of the rail into one structure, without in the least affecting the crystalline structure of the rail.

We want an opportunity to show you how to save from 20 to 50 cents on every bond you install.

### THE LINCOLN BONDING CO.

636 Huron Rd.

CLEVELAND, OHIO

Agents: Lewis & Roth Company, 312 Denckla Bldg., Philadelphia, Pa.; Charles N. Wood Company, 79 Milk St., Boston, Mass.

## Special Track Work

Built along quality lines  
withstand long, severe  
service.



Switches,  
Frogs, Crossings,  
Manganese Centers

### New York Switch & Crossing Co.

Hoboken, New Jersey

## T Rails and Nelsonville Filler and Stretcher Brick

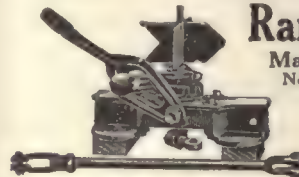
offer all the advantages without the disadvantages of the groove rail.

Construction approved by City Engineers.

### THE NELSONVILLE BRICK CO., Nelsonville, Ohio

## Ramapo Iron Works

Main Office, Hillburn, N. Y.  
New York Office: 30 Church St.



Automatic Switch Stands,  
T-Rail Special Work,  
Manganese Construction,  
Crossings, Switches, Etc.



"WHALEBONE"

## Fibre Track Insulation

DIAMOND STATE FIBRE CO.

Fismere, Del.

Bridgeport, Penna.

Chicago, Ill.

## Kilby Frog & Switch Co.

BIRMINGHAM, ALA.

Tongue Switches, Mates, Frogs, Curves and  
Special Work of all kinds for Street Railways.



# KERITE

THE use of Kerite Insulated Wires and Cables is the logical result of experience.



**KERITE INSULATED WIRE & CABLE COMPANY**  
NEW YORK CHICAGO

## STEEL POLES For every pole purpose



Bates Steel Poles in use by the DES MOINES CITY RAILWAY, Des Moines, Iowa, U. S. A.

Strongest STEEL POLE of like weight in the world.  
Best STEEL POLE in the world for electric railway trolley service.

Most artistic STEEL POLE in the world for any service.

We make the lowest prices.

We have constantly on hand about two thousand tons of steel and can make immediate shipments.

A full line of convenient malleable fittings.

Our steel pole *TREATISE* tells a big story, ask for it.

**BATES EXPANDED STEEL TRUSS CO.**  
208 South La Salle St., Chicago, Ill., U. S. A.

### Aristos "COPPERWELD"—Copper Clad Steel Wire— Beats Solid Copper 40 Ways

Cheaper—Lighter—Stronger—Higher Elastic Limit—Costs less to Maintain  
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### Make Splices Easy to Open Up, Too

All you need is a wrench to open up a splice or make it up again, if you use

### FRANKEL SOLDERLESS CONNECTORS

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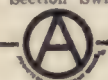
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Third Rail Insulators, Trolley Bases, Poles, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.



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DISPATCHER MOTORMAN  
Direct Contact Between  
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It Meets Every Requirement—The Celebrated

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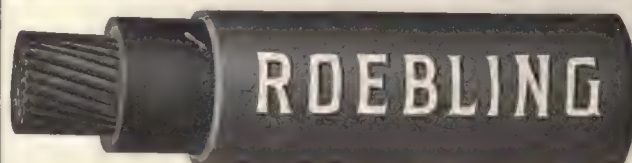
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And all kinds of Electrical Conductors

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.

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**WE MAKE THIS GRADE ONLY**

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No. 1 to sweep crossings.

No. 2 to handle light dirt and snow in the frogs, switches, and curves.

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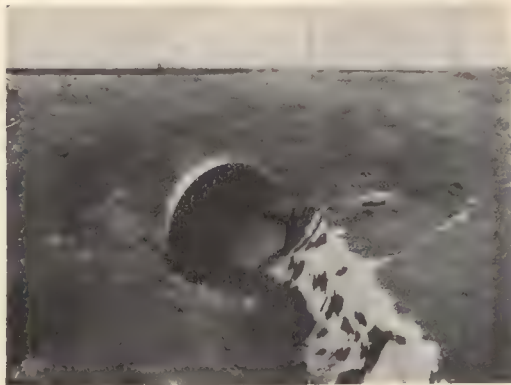
Insure uniform superheat at temperature specified

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When?—and *What's the Answer?*



**1—WHEN** a Railroad uses hundreds of feet—running into the thousands—of "ACME" Culverts in years past—

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Reference to this Railroad—and scores of other Railroad "ACME" users, if you wish.

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MANUFACTURERS  
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Clear and Black Air Drying Insulating Varnishes  
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**RAISES** the possibility of efficient stoking to a maximum.

Write for catalog "C."

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## KINNEAR Steel Rolling Doors FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fire-proof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the  
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The MODERN WAY of handling ASHES:  
GECO Pneumatic Ashhandling Systems  
GECO Steam Jet Ash Conveyors



**GREEN ENGINEERING CO.**

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## INSULATING TAPE of Quality





## Continuous Operation of the Power Plant

is a matter of extreme importance to the electric railway man. There must be no failure to supply the current when it is needed.

The constant use of Dearborn Treatment guarantees a high percentage of efficiency from the boilers. Made to suit the water conditions shown by analysis, it keeps the boilers free from scale, so that they steam freely and quickly, all corrosive or pitting action of the water is arrested, and, in fact, the boilers are in condition to yield their full quota of power constantly, while the fuel consumption is greatly reduced.

Send gallon of water for analysis, and let us advise regarding your plant requirements.

**Dearborn Chemical Company**  
McCormick Building, Chicago

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## INSULATION

### Saves Coils

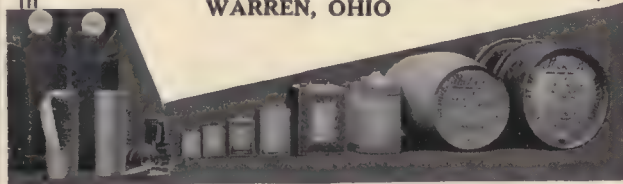
Packard insulating cloth is made of strong, flexible fabric with plenty of insulation and combines maximum dielectric strength with long life.

Packard impregnating compounds are produced according to formulae which have been worked out and tested in our own splendidly equipped laboratory.

**We couldn't buy them good enough for our purposes, so we make them.**

*May we send you prices and samples of our insulating cloth? Write for insulation Bulletin E.R.J.*

*The Packard*  
**Electric Company**  
WARREN, OHIO



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### Electric Railway Accessories

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An extra powerful and handy Jack for extra difficult jobs.

#### Forged Parts are Special Heat Treated

This Jack can be worked from many angles to load, yet full lifting power is available from any position. Write for catalog, details and price.

**The Buckeye Mfg. Co.**  
Alliance, Ohio



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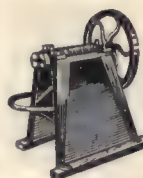
A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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## I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



Saved from the Ashes as many tickets are, means nickels lost to you. Avoid the risk.

**Patten Ticket Destroyer** is used right in the office under the eyes of trustworthy employees. It mutilates beyond redemption.

Scrap sold will pay for the machines.

Ask us for Circular J.

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## RAILWAY UTILITY CO.

*Sole Manufacturers*

**"Honeycomb" and "Round Jet" Ventilators** for Monitor and Arch Roof Cars, and all classes of buildings; also **Electric Thermometer Control** of Car Temperatures.

**721 W. FULTON ST. Chicago, Ill.** Write for **1328 BROADWAY New York, N.Y.** Catalogue



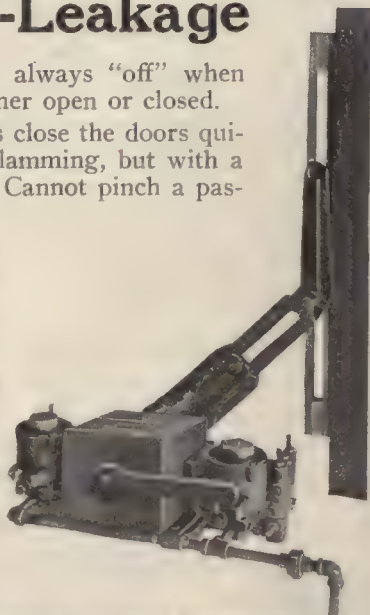
## Consolidated Door Engines Prevent Air-Leakage

—the air is always "off" when the door is either open or closed.

They always close the doors quietly, without slamming, but with a positive lock. Cannot pinch a passenger.

We offer a very effective manual control—also the electro-pneumatic control which cuts off the air when door is at rest.

Ask for detailed information.



100 Car Equipments of Consolidated Engines have recently been ordered by the Boston Elevated Railway

**Consolidated Car-Heating Co.**

New York

Albany

Chicago



## Sleet Scrapers

We are rapidly approaching the season that is the operating man's worst enemy. To insure continuity of Service—to keep the wheels moving—

### Nuttall Sleet Scrapers

should be on every car. Their cost is small—but they are mighty valuable when needed. We have a big stock of Nuttall Sleet Scrapers on hand now—we're ready to make quick shipment.

**UNION ELECTRIC COMPANY**  
Terminal Warehouses Pittsburgh, Pa.

## WE CAN CUT YOUR COST OF HEATING CURRENT

WRITE FOR THERMOSTATIC CONTROL INFORMATION

# GOLD

**ELECTRIC HEATERS** Cut Installation and Maintenance Charge.  
**VENTILATORS** Also Ventilate in Stormy Weather.  
**THERMOSTATS** Save Current.  
**ORIGINATED** the use of **NON-CORROSIVE** Wire for Electric Car Heaters.  
**ORIGINATED** The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

**Gold Car Heating & Lighting Co., 17 Battery Pl., New York**



## Johnson Registering Fare Boxes

used in connection with the car register increase receipts \$1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

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For the Answer to your Fare Collection Problems  
Write for

**"Earnings Per Passenger Mile"**  
It tells how the

**BONHAM TRAFFIC RECORDER**

Will Meet Your Needs

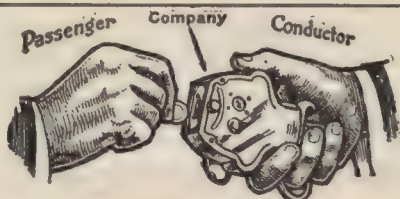
The Bonham Recorder Co., Hamilton, Ohio



## The Best Shade Rollers for Cars

**SPECIAL** shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature

*Stewart Hartshorn*



**Direct Automatic Registration By the Passenger**

**Rooke Automatic Register Co.**  
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## Ventilation—Sanitation—Economy—Safety

All Combined in:

**THE COOPER FORCED VENTILATION HOT AIR HEATER**

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

**THE COOPER HEATER CO., CARLISLE, PA.**



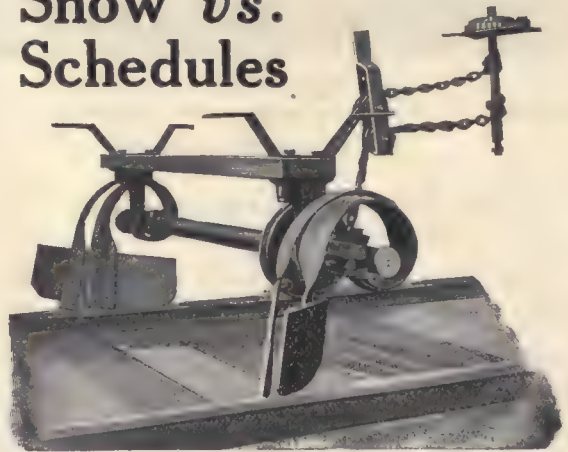
## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life **WITHOUT INJURY TO THE WIRE**. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the **LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD**.



**THE STAR BRASS WORKS**  
KALAMAZOO, MICH., U. S. A.

## Snow vs. Schedules



You'll get unbroken schedules if you equip your cars with

## The Root Spring Scraper

Made in several sizes to fit any car. The spring principle enables the scraper to pass over all conditions of track, high centers, switches, frogs, crossings, etc. We have scrapers for heavy snow removal, light work, and every other kind of service.

*Write to-day for our literature*

**Root Spring Scraper Co.**  
Kalamazoo, Mich.



This is the hub bearing of a **HENSLEY** Trolley Wheel after the rim is worn out.

**HENSLEY** Wheels require no bushing and maintain a perfect bearing in the hub until ready to be scrapped.

Our new catalog explains the merits of **HENSLEY** Wheels. Our trial proposition proves these merits.

**Hensley Trolley & Mfg. Co.**  
Detroit, Mich.

## SEVEN THOUSAND TROLLEY POLES IN STOCK

Not Gas Pipe but High Carbon, Butt-Welded Poles Made from Special Skelp and Capable of Standing 35 to 40 Pounds Wheel Pressure on the Trolley Wire. Immediate shipment.

**NUTTALL - - PITTSBURG**

## Have you our new Trolley Wheel Bulletin

*Write for your copy*

**The Eureka Company** North East, Pa.



**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

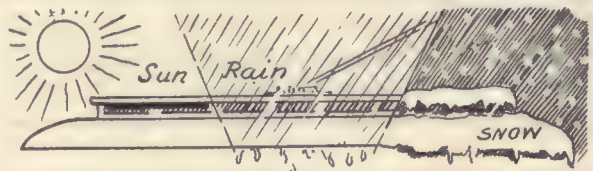
**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading Railroads. For details address

**AMERICAN MASON SAFETY TREAD CO.**

Main Offices: Lowell, Mass. Branch Offices: Boston, New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.



## "Bayonne" Car Roofing

Made and impregnated to withstand the elements  
Only One Color Coat Necessary at Home

Made from a closely-woven special fabric, every fibre of which is treated with a *preservative* which renders it proof against the quick deterioration to which ordinary painted cotton duck is susceptible. Neat in appearance—saves time, maintenance and prevents leakage. Three weights, yellow and brown, widths from 22 to 120 inches. *Compare the samples!*  
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Just purchased the entire equipment of the Elkins Electric Railway Co., Elkins, W. Va., consisting of 9 miles of 75 and 80 lb. rail, same amount of 4-0 copper wire, poles, ties, bridges, bonds for the rail, spikes, bolts, frogs and switches, cross irons, cross overs, electric power plant, voltage 550 d.c. 5 passenger cars, 2 work cars, and 2 freight cars. Everything complete, and ready to operate.

Will make very attractive prices on this material to move quickly. Please wire if interested.

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or **L. K. HIRSCH**

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## ARCHER & BALDWIN

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TELEPHONE 4337-4338 RECTOR

### Rotary Converters, 25 Cycle

2--150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

### Rotary Converters, 60 Cycle

2--150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4--100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy. Above will be sold with or without transformers.

### Railway Motors

2--75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

**IMMEDIATE DELIVERY**

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FRANK MACGOVERN, Pres. & Gen. Mgr.

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### 60 CYCLE ROTARY CONVERTERS

1 1000 KW. Gen. Elec., type HC, form P, 6 phase, 1667 amps., 600 volts D.C., 360 R.P.M.

2 300 KW. Gen. Elec., type HC, form P, 6 phase, 500 amps., 550 volts D.C., 900 R.P.M., with end play and speed limit device.

1 300 KW. Westinghouse, 3 phase, 600 volts D.C., 900 R.P.M., with starting motor.

### 550 VOLT DIRECT CURRENT UNIT

300 KW. Westinghouse, 550 volt, 145 R.P.M., dir. conn. to 16½" and 30½" x 30" Buckeye tandem engine.

Immediate Delivery

**THIS IS OF NECESSITY ONLY A PARTIAL LIST—  
SEND FOR CATALOG**

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### Generator Units and Steam Engines

Two Fischer Generating Units, each unit consisting of one 18" x 18" single cylinder, four valve, outside crank, self-oiling, automatic Fischer Engine, direct connected to a Westinghouse Electric & Manufacturing Co.'s generator. Generator 150 K.W., 250 volts, D.C., speed 250 R.P.M., together with one switchboard complete with instruments and switches.

Also one L. H. Wetherill Corliss Engine, 20" x 48", Band Wheel, 14' diameter, 26½" face, cast in halves.

Also one Providence Steam Engine Works, Green-Corliss Engine, R.H. Cylinder 26" x 48", wheel 21' diameter, cast in 8 segments, bolted together, rim 15" x 14".

Above equipment is in first class condition. If interested have your representative call at our works and submit us with separate price on each item after examining same.

**The Wilmington Steel Company**

Wilmington, Delaware

## CARS FOR SALE

OPEN and CLOSED  
MOTOR and TRAIL

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**

Commonwealth Bldg.

Philadelphia, Pa.

## COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD  
STREET RAILWAY MOTORS

GET OUR PRICE

WE CAN SAVE YOU MONEY

America's Greatest Repair Works

**CLEVELAND ARMATURE WORKS, Cleveland, O.**

## THE ART OF BUYING

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Service Department is ready to serve you, Mr. Manufacturer.

**ELECTRIC RAILWAY JOURNAL**

239 West 39th Street, New York



# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, Side Line Wanted, etc., undisplayed advertisements cost **two cents a word**, minimum charge 50 cents an insertion, payable in advance.

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For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted (with one line of display heading), undisplayed advertisements cost **three cents a word**, minimum charge \$1.50 an insertion.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost \$2.40 an inch.

In replying to advertisements, do NOT enclose original testimonials, drawings or photographs that you may want returned. Advertisements for men often produce several hundred applications and no employer can be expected to read all of these carefully and return the papers or applications of those in which he is not interested. State your experience and qualifications in as concise and neat a manner as possible and enclose COPIES of your testimonials.

When advertising machinery, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

1 p. (1½x3¾ ins.).....	\$5.00	1 in. (1x2½ ins.).....	\$3.00
½ p. (2½x3¾ ins.).....	10.00	4 inches (4x2½ ins.)..	11.60
¾ p. (5x3¾ or 2½x7 ins.)..	20.00	8 inches (8x2½ ins.)..	22.40
1 p. (10½x3¾ or 5x7 ins.)..	40.00	15 inches.....	40.50
1 page (10½x7 ins.) 30 inches....	\$80.00		

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used in each issue following first insertion:

1 page.....	\$80 a page	18 pages.....	\$56 a page
3 pages.....	72 a page	26 pages.....	53 a page
6 pages.....	64 a page	40 pages.....	52 a page
12 pages.....	58 a page	52 pages.....	50 a page

### FOR SALE

#### A Metal Opportunity

Take advantage of the high prices of metal. We are cash buyers of all grades of scrap metal. Our specialty is buying electric plants, storage battery plants, storage battery plates and sediment. We buy small lots as well as large lots. Write us and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Co., 30-31 India Wharf, Boston, Mass.

#### Engine for Sale

One horizontal McIntosh & Seymour tandem compound condensing engine, 11 in. and 20 in. x 30 in., 240 I.H.P., at one-third cut off; 300 I.H.P. at one-half cut off; 125 lb. steam pressure; 26 in. vacuum. Flywheel, weight 13,000 lb.; 32 in. face, 11 ft. diam. This engine is in first class operating condition and could be shipped immediately. The American Railways Company, Witherspoon Bldg., Philadelphia.

#### Our Prices Will Interest You

Two 25 kw., 250 v., 100 amp., 300 r.p.m. D.C. Westinghouse generators, connected to 9 x 11 Westinghouse engine.  
Four panel switchboards with two direct Thomson retorting wattmeters.  
Two Weston ammeters—two Weston oval meters with necessary switches.  
Two small combination compressed switchboards.  
Two ¼ kw. D.C. generators for producing sparks driven by belt on main shaft.  
One Gould 4 x 5 power pump No. 315 with compressed air tanks, used for starting engine, pumps are belt driven by 1¼ hp. Westinghouse electric motor, serial No. 368683.  
This machinery has been used a very short while and is practically new, best cash offer takes it. Must be removed at once. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

Before Buying **Rails, Cars, Locomotives, Machinery Equipment** get Zelnicker's September Bulletin, containing 40 pages of Real Bargains.

### ZELNICKER IN ST. LOUIS

423 First Nat. Bank, Chicago  
910 Hennen Bldg., New Orleans

#### WORKS:

24th to 26th & McCausland, E. St. Louis, Ill.  
General Office: St. Louis

### MISCELLANEOUS WANTS

#### Motors Wanted

We are in the market for several A.C. and D.C. motors, and also some plating dynamos, any size or make. Write us what you have to offer. Schwartz & Land, 207 Centre St., New York City.

### POSITIONS WANTED

ACCOUNTANT, age 25, married, graduate of high school and business course, five years' experience in steam and electric railway offices, desires position as auditor receipts or traveling auditor with good prospect for advancement. Have good references. Box 948, Elec. Ry. Jour.

CIVIL engineer desires position as maintenance of way engineer. At present employed in like position and also as electrical engineer. Technical graduate, with 8 years' practical experience. Box 1234, Elec. Ry. Jour.

COMPETENT operating official open for engagement. Many years' experience high speed, single track and street railway work, also valuation reports, traffic, surveys, etc. Excellent character and ability, references. Will go anywhere; correspondence solicited. Box 1229, Elec. Ry. Jour.

ELECTRIC railway executive with 12 years' experience, construction and operation, four properties, excellent references, city or interurban. Good organizer and systematizer, all departments. Short efficient methods with results, desires position; will locate anywhere. Box 1212, Elec. Ry. Jour.

GENERAL manager experienced in all branches of street railway business, especially legislative and preliminary work connected with development of new propositions, wishes to make change. Can get results by up-to-date methods. Best references. Box 1232, Elec. Ry. Jour.

IS your Freight Department troubling you or do you anticipate starting one? I have experience, initiative and courage. The more difficult your proposition, the better. Write me. Box 1227, Elec. Ry. Jour.

### POSITIONS WANTED

POSITION wanted as M.M. of a small road. Understands thoroughly the practical end of the various lines of street railway work. Strictly sober and can furnish first class references. Box 1228, Elec. Ry. Jour.

POSITION wanted as superintendent by young man having experience in operating both city and interurban lines. Am familiar with high speed, single track, interurban operation under standard steam railroad rules. Age 31. Address Box 1235, Elec. Ry. Jour.

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### POSITIONS VACANT

CHIEF engineer for Power Station of large Interurban Railway in Central States. Responsible position which demands experienced engineer who can operate economically. Give experience, references and wages expected. Box 1213, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

ELECTRICAL draftsmen wanted on power station and sub-station work. Apply to G. C. Hall, Interborough Rapid Transit Co., 621 Broadway.

WANTED—One line foreman and two good linemen by railway and lighting company in Pennsylvania. Box 1221, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

### BUSINESS OPPORTUNITIES

#### Corporation Requires Financing

Public utility corporation requires financing. Opening for a man, firm or banking concern with knowledge of handling securities of power, light, traction and freight properties and engineering reports. Must control capital and be ready to assume active interest in the company. Full particulars to principals only. References required. Box 1233, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.



# READY - REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.  
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.  
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

**Acetylene Apparatus.**  
(See Cutting Apparatus, Oxy-Acetylene.)

**Acetylene Service.**  
Prest-O-Lite Co., Inc.

**Advertising, Street Car.**  
Collier, Inc., Barron G.

**Air Cleaners.**  
Lord Mfg. Co.

**Air Rectifiers.**  
Lord Mfg. Co.

**Alloys and Bearing Metals.**  
(See Bearings and Bearing Metals.)

**Alloys, Steel and Iron.**  
Titanium Alloy Mfg. Co.

**Anchors, Guy.**  
Electric Service Supplies Co.  
Holden & White.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Anti-Climbers.**  
Railway Improvement Co.

**Automobiles and Busses.**  
Brill Co., The J. G.

**Axle Straighteners.**  
Columbia M. W. & M. I. Co.

**Axles.**  
Taylor Elec. Truck Co.

**Axles, Car Wheel.**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
Cincinnati Car Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbling Devices.**  
American General Engrg. Co.  
Columbia M. W. & M. I. Co.

**Badges and Buttons.**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Bankers and Brokers.**  
Halsey & Co., N. W.  
Redmond & Co.

**Batteries, Storage.**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings and Bearing Metals.**  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Long Co., E. G.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center.**  
Baldwin Locomotive Works.  
Holden & White.

**Bearings, Roller and Ball.**  
Gurney Ball Bearing Co.  
Railway Roller Bearing Co.

**Bearings, Roller Side.**  
Holden & White.

**Bells and Gongs.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail.**  
Niles-Bement-Pond Co.  
Zelnicker Sup. Co., W. A.

**Blow Torches for Soldering and Brazing.** (See Cutting Apparatus, Oxy-Acetylene.)

**Blowers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Boilers.**  
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**  
Dearborn Chemical Co.

**Bond Clips.**  
Electric Railway Improve. Co.

**Bond Testers.**  
American Steel & Wire Co.

**Bonding Apparatus.**  
Electric Railway Improve. Co.  
Ohio Brass Co.  
Prest-O-Lite Co., Inc.

**Bonding Tools.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

**Bonds, Rail.**  
American Steel & Wire Co.  
Electric Railway Improve. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Book Publishers.**  
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**  
Niles-Bement-Pond Co.

**Braces, Rail.**  
Kilby Frog & Switch Co.

**Brackets and Cross Arms.** (See also Poles, Ties, Posts, Etc.)  
American Bridge Co.  
Bates Expanded Steel Truss Co.  
Electric Service Supplies Co.  
Int'l Creosoting & Constr. Co.  
Lindsley Bros. Co.  
Ohio Brass Co.  
Union Electric Co.  
Western Electric Co.

**Brake Adjusters.**  
Smith-Ward Brake Co.

**Brake Shoes.**  
Amer. Brake Shoe & Fdy. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
National Brake Co.  
St. Louis Car Co.  
Westinghouse Trac. B. Co.

**Brooms, Track, Steel or Rattan.**  
Faxon, J. W.  
Western Electric Co.  
Zelnicker Sup. Co., W. A.

**Brush Holders.**  
Anderson Mfg. Co., A. & J. M.

**Brushes, Carbon.**  
Dixon Crucible Co., Jos.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Bumpers, Car Seat.**  
Electric Service Supplies Co.

**Bunkers, Coal.**  
American Bridge Co.

**Bunting.**  
Boyle & Co., Inc., John.

**Bushings, Case Hardened and Manganese.**  
Bemis Car Truck Co.

**Bushings, Fibre.**  
Diamond State Fibre Co.

**Buttons.** (See Badges and Buttons.)

**Cables.** (See Wires and Cables.)

**Carbon Brushes.** (See Brushes, Carbon.)

**Car Equipment.** (For Fenders, Heaters, Registers, Wheels, etc.—see those headings.)

**Car Panel Safety Switches.**  
Krantz Mfg. Co.

**Car Trimmings.** (For Curtains, Registers, Doors, Seats, etc. See those headings.)

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.  
Kuhlman Car Co., G. C.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Self-Propelled.**  
Electric Storage Battery Co.  
General Electric Co.

**Car Stops, Automatic.**  
Consolidated Car-Heating Co.

**Castings, Brass.**  
Frankel Connector Co.

**Castings, Composition or Copper.**  
Anderson M. Co., A. & J. M.

**Castings, Gray Iron and Steel.**  
Amer. Brake Shoe & Fdry. Co.  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Long Co., E. G.  
St. Louis Car Co.  
Standard Steel Works Co.  
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**  
Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Long Co., E. G.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**  
Electric Service Supplies Co.  
Holden & White.  
Long Co., E. G.  
Lord Mfg. Co.  
Ohio Brass Co.  
Union Electric Co.  
Wood Co., Chas. N.

**Ceiling, Car.** (See Headlining.)

**Charging Sets, Storage Battery.**  
General Electric Co.

**Cheese Cloth.**  
Boyle & Co., Inc., John.

**Chemists.**  
Little, Inc., Arthur D.

**Circuit Breakers.**  
Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Clamps.**  
Frankel Connector Co.

**Clamps and Connectors for Wires and Cables.**  
Anderson M. Co., A. & J. M.  
Electrical Engrs. Equip. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Klein & Sons, Mathias.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.** (See also Snow - Plows, Sweepers and Brooms.)  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Western Electric Co.  
Van Dorn & Dutton Co.

**Cleats, Car Wiring.**  
General Electric Co.

**Clusters and Sockets.**  
General Electric Co.

**Coal and Ash Handling.** (See Conveying and Hoisting Machinery.)

**Coasting Clocks.**  
Railway Improvement Co.

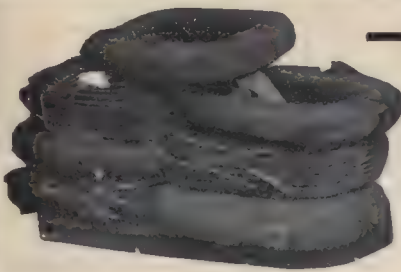
**Coll Banding and Winding Machines.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Western Electric Co.

**Colls, Armature & Field.**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Colls, Choke & Kicking.**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**  
International Register Co., The  
Johnson Fare Box Co.





—This  
Is  
False  
Economy

Old coils are old coils because of the insulation—not because of the copper. The copper is 100% pure—too high grade for casting purposes—too high priced to sell as scrap.

## Independent Treatment Is True Economy

It makes out of an old coil a new one of similar characteristics, but better in point of insulation. That is because Salamander Pine Asbestos is used—for asbestos insulated coils can be impregnated at a temperature that would destroy cotton insulated coils.

Independent Treatment includes our highly developed processes, modern appliances, and skilled labor—all at a trifling price—merely that of the actual insulation used.

Better write for our proposition today or send a few old coils for demonstration.

**Independent Lamp & Wire Co., Inc.**

Offices: 1737 Broadway, New York      FACTORIES: York, Pa., and Weehawken, N. J.

## Working with A Single Purpose

No considerations of expediency, no motives of the moment, ever have influenced the making of

**Weston**

## Indicating Instruments

The single purpose of this Company's founder, and of the Company itself, has been the production of Instruments of Precision which should more and more nearly approach absolute perfection.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or D.C. Circuits, instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

**Weston Electrical Instrument Co.**

21 Weston Ave., Newark, N. J.

23 Branch Offices in the Larger Cities.



**Model 310  
Single Phase and D. C.  
Wattmeter**

One of the Portable Electrodynamometer Group which also includes Model 329 Polyphase Wattmeter, Model 341 A. C. and D. C. Voltmeter and Model 370 A. C. and D. C. Ammeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

## "Watch Your Step"

If it has  
Universal Safety Tread  
on it,  
Proceed in Safety.  
If Not,  
Be Careful

**Universal Safety Tread Co., Waltham, Mass.**

New York      Philadelphia      Chicago

## The "Hycap=Exide" Battery

for  
STORAGE BATTERY STREET CARS  
THE ELECTRIC STORAGE BATTERY CO  
PHILADELPHIA

## S-W Shim Slack Adjusters Save Brakeshoes and Labor

SMITH-WARD BRAKE COMPANY, Inc.  
17 Battery Place, New York

W. R. Kerschner Co., Inc.  
Eastern Sales Agents  
50 Church St., New York City

## U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY  
Chicago      Washington, D. C.

## RAILWAY SUPPLIES

### SELLING AGENTS FOR

Tool Steel Gears and Pinions  
Johnson Fare Box  
Perry Side Bearings  
Hartman Centering Center Plates  
Wasson Trolley Bases  
Garland Ventilator  
Electric Arc Welders  
High Class Railway Varnishes  
and Enamels  
Chillingworth Seamless Gear Cases

Special Agents for { Tool Steel Gear & Pinion Co.  
Johnson Fare Box Co.  
C. & C. Electric & Mfg. Co.  
Holden & White

General Agents for Anglo-American Varnish Co.  
Eastern Agents for Union Fibre Co.  
Southern and New England Agents for Thayer & Co.



# READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

**Commutator Slotters.**  
American General Eng'g Co.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices.**  
General Electric Co.

**Commutators or Parts.**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Long Co., E. G.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Compressors, Air.**  
General Electric Co.  
Westinghouse Trac. B. Co.

**Condensers.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Conduits.**  
Standard Underground Cable Co.  
Western Electric Co.

**Connectors, Solderless.**  
Frankel Connector Co.

**Controller Fingers.**  
Lord Mfg. Co.

**Controller Handles.**  
Lord Mfg. Co.

**Controller Regulators.**  
Electric Service Supplies Co.

**Controllers or Parts.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Controlling Systems.**  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Converters, Rotary.**  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**  
American Bridge Co.  
Green Engrg. Co.

**Cord, Bell, Trolley, Regulator, etc.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Long Co., E. G.  
Roebbing's Sons Co., John A.  
Samson Cordage Works.

**Cord Connectors and Couplers.**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

**Cotton Duck.**  
Boyle & Co., Inc., John.

**Couplers, Car.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Long Co., E. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

**Cranes. (See also Hoists.)**  
Niles-Bement-Pond Co.

**Crescoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**  
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Culverts.**  
American Rolling Mill Co.  
Bark River B. & Culvert Co.  
California Cor. Culvert Co.  
Canton Culvert & Silo Co.  
Coast Culvert & Flume Co.  
Corrugated Culvert Co.  
Delaware Metal Culvert Co.

Dixie Culvert & Metal Co.  
Hardesty Mfg. Co., R.  
Illinois Corrugated Metal Co.  
Independence Co. Culvert Co.  
Iowa Pure Iron Culvert Co.  
Kentucky Culvert Mfg. Co.  
Lee-Arnett Co.  
Lone Star Culvert Co.  
Lyle Corrugated Culvert Co.  
Michigan Bridge & Pipe Co.  
Montana Culvert Co.  
Nebraska Culvert & Mfg. Co.  
Nevada Metal Mfg. Co.  
New England Metal Cul. Co.  
North East Metal Co.  
Northwestern Sheet & I. Wks.  
O'Neill Co., W. Q.  
Ohio Corrugated Culvert Co.  
Pennsylvania Metal Cul. Co.  
Road Supply & Metal Co.  
Sioux Falls Metal Cul. Co.  
Spencer, J. N.  
Spokane Corr. Cul. Co.  
Tennessee Metal Culvert Co.  
Utah Corr. Culvert & Flume Co.  
Virginia Metal & Culvert Co.  
Western Metal Mfg. Co.  
Wyatt Mfg. Co.

**Curtains and Curtain Fixtures.**  
Brill Co., The J. G.  
Curtain Supply Co.  
Electric Service Supplies Co.  
Hartshorn Company, Stewart.  
Pantasote Co., The.  
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene.**  
Prest-O-Lite Co., Inc.

**Derailing Devices. (See also Track Work.)**  
Cleveland Frog & Crossing Co.

**Despatching Systems.**  
Simmen Automatic Ry. Sig. Co.  
Western Electric Co.

**Destination Signs.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Western Electric Co.

**Detective Service.**  
Wisch Service, P. Edward.

**Door Operating Devices.**  
Consolidated Car Heating Co.

**Doors and Door Fixtures.**  
Brill Co., The J. G.  
General Electric Co.  
Hale & Kilburn Co.

**Doors, Steel Rolling.**  
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**  
American Steel & Wire Co.  
Electric Service Supplies Co.  
Long Co., E. G.  
Niles-Bement-Pond Co.  
Ohio Brass Co.

**Dryers, Sand.**  
Electric Service Supplies Co.  
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**  
Archbold-Brady Co.  
Brownell, H. L.  
Burch, Edw. P.  
Byllesby & Co., Inc., H. M.  
Ford, Bacon & Davis.  
Gulick-Henderson Co.  
Hunt & Co., Robert W.  
Jackson, D. C. & Wm. B.  
Little, Arthur D.  
Richey, Albert S.  
Roosevelt & Thompson.  
Sanderson & Porter.  
Schofield Engineering Co.  
Stone & Webster Eng. Corp.  
White Companies, J. G.  
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**  
Westinghouse Elec. & M. Co.

**Engines, Steam.**  
Westinghouse Elec. & M. Co.

**Fare Boxes.**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
Johnson Fare Box Co.

**Fences and Fence Posts.**  
American Steel & Wire Co.

**Fencing Wire.**  
American Steel & Wire Co.

**Fenders and Wheel Guards.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Cleveland Fare Box Co.  
Consolidated Car Fender Co.  
Electric Service Supplies Co.  
Lord Mfg. Co.  
Star Brass Works.  
Western Electric Co.

**Fibre.**  
Diamond State Fibre Co.  
U. S. Metal & Mfg. Co.  
Westinghouse Elec. & M. Co.

**Fibre Tubing.**  
Diamond State Fibre Co.  
Westinghouse Elec. & M. Co.

**Field Collis. (See Collis.)**

**Flooring Composition.**  
American Mason Safety Tread Co.  
Western Electric Co.

**Forgings.**  
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
Daum, A. F.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**  
Columbia M. W. & M. I. Co.  
Economy Fuse & Mfg. Co.  
General Electric Co.

**Gaskets.**  
Diamond State Fibre Co.  
Imperial Rubber Co.  
Power Specialty Co.

**Gas Producers.**  
Westinghouse Elec. & Mfg. Co.

**Gates, Car.**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Jewett Car Co.

**Gages, Oil and Water.**  
Ohio Brass Co.

**Gear Blanks.**  
Carnegie Steel Co.  
Diamond State Fibre Co.  
Standard Steel Works Co.

**Gear Cases.**  
Electric Service Supplies Co.  
U. S. Metal & Mfg. Co.  
Westinghouse Elec. & M. Co.

**Gears and Pinions.**  
American General Eng'g Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Diamond State Fibre Co.  
Electric Service Supplies Co.  
General Electric Co.  
Long Co., E. G.  
Nuttall Co., R. D.  
Union Electric Co.  
U. S. Metal & Mfg. Co.

**Generating Sets, Gas-Electric.**  
General Electric Co.

**Generators, Alternating Current.**  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Generators, Direct Current.**  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**  
Dixon Crucible Co., Joseph.  
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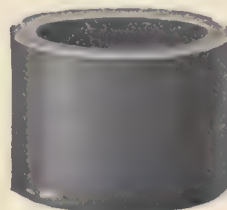
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St. Louis  
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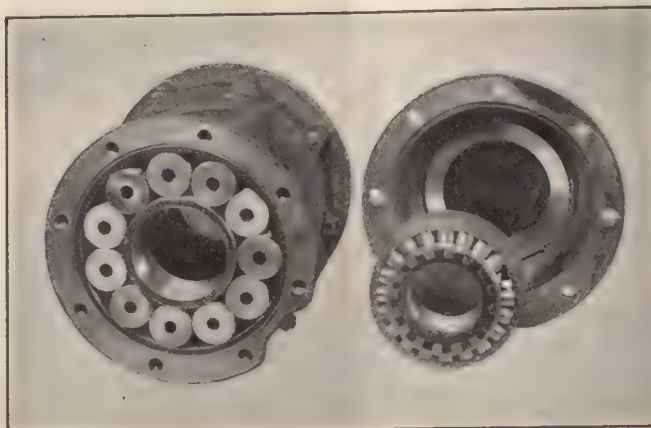
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When the Empire United Railways, Inc., Syracuse, N. Y., as you saw in Messrs. Voth and Metcalfe's article of May 6, wanted to know the honest-to-goodness facts about

### Rollway Bearings

it applied the deadly parallel between a Rollway Bearing car and a plain bearing car of the same weight (70,000 lb.) on the same schedule. Here is the parallel for

ENERGY AND LUBRICATION COSTS		
	Plain Bearings	Roller Bearings
Annual mileage .....	103,446	103,446
Energy consumption, kilowatt-hours.....	372,405	327,717
Energy cost, at 1 cent per kilowatt-hour....	\$3,724.05	\$3,277.17
Cost of oil .....	10.35	1.04
Cost of waste .....	4.14	....
Cost of rebabbiting, labor and material.....	10.36	....
Cost of labor for oiling.....	8.27	0.52
Cost of labor replacing oil every 1000 miles..	3.11	....
Total annual cost.....	\$3,760.28	\$3,278.73
Difference in annual saving, \$481.45 or 12.8 per cent.		

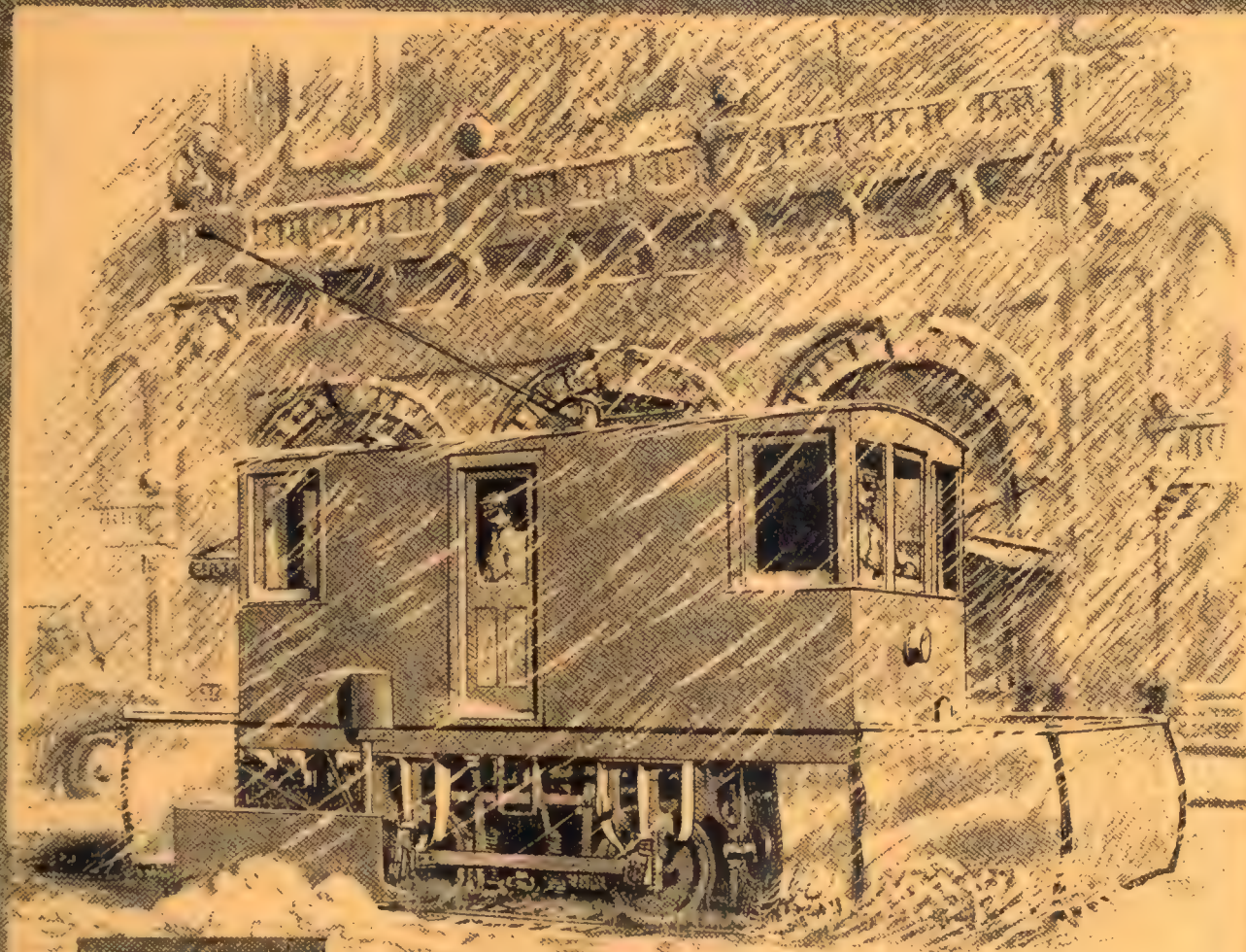
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*Think it over !*



The Railway Roller Bearing Co.  
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Gear-Drive Snow Sweepers are a long stride in advance of the sprocket-and-chain type in that the number of wearing parts is reduced to a few, and each of these is provided with large phosphor bronze bearings and ample means for lubrication. The motor for driving the brooms is located at the center of the cab and has propeller shafts extending to the broom shafts and connecting with bevel gears enclosed and running in lubricant. A simple and efficient clutch on each propeller shaft is operated by a conveniently located lever—one lever for both clutches—and like all the rest of the mechanism is of extra sturdy construction to stand rough handling and severe service conditions. The steel wing for leveling the snow at the side is improved both as to strength of construction and means of rapid adjustment and, all in all, this powerful snow fighting machine is mechanically modernized to work hard and fast and keep in trim.

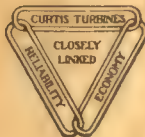
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